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NEEDLE TRADES, MATHEMATICS - I.
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DESCRIPTORS- *STUDY GUIDES, *TRADE AND INDUSTRIAL EDUCATION, *NEEDLE TRADES, *PRACTICAL MATHEMATICS, HIGH SCHOOLS,

THE NEEDLE TRADES INDUSTRY CONSISTS OF THREE TYPES OF ESTABLISHMENTS -- THE REGULAR MANUFACTURERS, THE APPAREL JOBBERS, AND THE CONTRACTORS. THE FUNCTIONS INCLUDED COVER A WIDE SCOPE FROM BUYING OF RAW MATERIAL TO SELLING OF THE FINISHED APPAREL. THE PURPOSE OF THIS STUDY GUIDE IS TO FURNISH BASIC KNOWLEDGE IN MATHEMATICS AND DEVELOP SKILL IN SOLVING MATHEMATICAL PROBLEMS PERTINENT TO THE NEEDLE TRADES. IT WAS PREPARED BY THE AUTHOR AND FOLLOWS COURSE OF STUDY APPROVED BY THE BOARD OF EDUCATION. THE GUIDE INCLUDES SOME LESSONS DESIGNED FOR CLASS DISCUSSION AND OTHERS FOR TEACHING COMPUTATION, JUDGMENT, ETC. UNITS INCLUDE -- (1) WHOLE NUMBERS, (2) FRACTIONS, (3) MEASUREMENT, (4) RATIO AND PROPORTION, (5) DECIMALS, (6) PERCENTAGE, (7) GEOMETRIC FORMS, AND (8) ACCOUNTS. ALL ARE RELATED TO VARIOUS ASPECTS OF THE NEEDLE TRADES. RELATED INFORMATION AND APPLICABLE PROBLEMS ARE GIVEN WITH EACH UNIT, AND UNIT ACHIEVEMENT TESTS ARE PROVIDED. THE INSTRUCTOR SHOULD BE A MATH SPECIALIST OR A NEEDLE TRADES INSTRUCTOR. THE STUDENT SHOULD BE OF HIGH SCHOOL AGE, HAVE A NEEDLE TRADES GOAL, AND HAVE A MEDIUM APTITUDE FOR THE OCCUPATION. THIS DOCUMENT IS AVAILABLE FOR $2.00 FROM VOCATIONAL-TECHNICAL CURRICULUM LABORATORY, RUTGERS UNIVERSITY, 10 SEMINARY PLACE, NEW BRUNSWICK, NEW JERSEY 08903. (MS)

State of New Jersey
Department of Education
Vocational Division

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MATHEMATICS 1 - NEEDLE TRADES

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U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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State of New Jersey
Department of Education
Vocational Division

NEEDLE TRADES MATHEMATICS - I

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INTRODUCTION

Skill in mathematics is as valuable to the needle trades worker as skill in handling the operations of the trade. The student who masters both enters the field with a double asset.

It is the purpose of this book to furnish the student with a basic knowledge of mathematics and to develop her skill in solving mathematical problems pertinent to the needle trades. Wherever it was possible, problem situations and terms common to the trade were used to familiarize the student with everyday practices in the field.

Fashion, after all, is a most important industry in America. The job opportunities are unlimited. Some of the highest paid feminine jobs are in Fashion, Merchandising, Promotion, and Advertising. Did you know that a buyer of piece goods can earn more than $15,000 a year? A competent student with a needle trades background and a workable knowledge of mathematics could climb into one of these desirable careers.

The major part of the industry, generally known as the needle trades, consists of three types of establishments: (1) the regular factories or manufacturers; (2) the apparel jobbers; (3) the contract factories or contractors. As it would be impossible to present to the student problems dealing with all the different types of concerns in the trade, most of the problems have been worked out from a manufacturer's viewpoint. The functions of the manufacturing company cover the widest scope, from the buying of raw materials, through designing and preparing samples and arranging for the manufacture of garments from their materials, to the selling of the finished apparel.

The atmosphere of the book is informal and informing, stressing always the application of practical mathematics rather than the formal and theoretical.

This book includes many types of lessons. Some are designed for class discussion and serve to provide a background in the special application to the needle trades field; others supply specific practice in the kind of written or mental computations needed; still others are specially designed to teach pupils how to select pertinent facts, how to judge whether a result is reasonable, or how to estimate. It would be well to encourage the student to preserve the complete set of solutions to the problems in a suitable notebook for future reference, as there is every probability that she will use some of them later on when she goes to work.

If the student makes a sincere effort to master the pretest and review lessons, she will find she can more easily grasp the new material. The mastery of this course will provide not only a practical background for her vocation, but for life preparation as well.

NEEDLE TRADES MATHEMATICS - I

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UNIT I - WHOLE NUMBERS

Pre-Test No. 1

OBJECTIVE: To recall the knowledge of whole numbers and to review working with whole numbers.

RELATED INFORMATION:

In this lesson you will have an opportunity to review the fundamental processes of working with whole numbers. After you have successfully completed this lesson, you will be ready to proceed with the mathematics planned especially for needle trades workers.

PROCEDURE:

1. Do all the work on paper furnished by the instructor. Do not write on this sheet.
2. Read the problem through very carefully.
3. See what facts are given.
4. See what the problem asks you to find.
5. Do not leave a problem until you are sure the answer is right. This is not a speed test.
6. Papers will be checked for legibility and neatness as well as accuracy.

I. Review of signs and terms. Indicate which of the following are true and which are false.

1. The sign ÷ is the sign of addition. ____________
2. To add means to take away. ____________
3. The sign ⟌ is a sign of division. ____________
4. The sign + means equals. ____________
5. The sign X is the sign of addition. ____________
6. The sign ÷ is the sign of division. ____________

7. Zero means not any, or nothing. ________

8. Plus means that numbers are to be added. ________

9. 12 is 5 less 7. ________

10. The sign = between two things means that they are the same value. ________

11. The sum is the name of the answer in multiplication. ________

12. - is the sign for minus. ________

13. The difference is the name of the answer in subtraction. ________

14. 13 is 4 more than 9. ________

15. What is left when you divide is called the remainder. ________

II. Addition

Add the following mentally. Put only the answers on your paper.

1. 5 + 8 + 4 + 3 + 2
2. 9 + 7 + 5 + 1 + 6
3. 10 + 14 + 15 + 11 + 17
4. 12 + 3 + 6 + 15 + 7
5. 8 + 13 + 6 + 5 + 17

III. Copy the following on your paper and add.

1.	2.	3.	4.	5.
695	465	72877	1245	475891
499	256	25734	1770	698507
357	300	86754	1335	579243
382	537	42576	1245	126759
	364	65232	2715	

IV. Subtract the following mentally and put only the answers on your paper. Do not copy the problem.

1. 17 - 5
2. 12 - 7
3. 88 - 11
4. 19 - 6
5. 13 - 5

V. Copy the following on your paper and subtract.

1. $\begin{array}{r} 182 \\ -\ \underline{130} \end{array}$
2. $\begin{array}{r} 1635 \\ -\ \underline{1336} \end{array}$
3. $\begin{array}{r} 2715 \\ -\ \underline{1164} \end{array}$
4. $\begin{array}{r} 276 \\ -\ \underline{208} \end{array}$
5. $\begin{array}{r} 10905 \\ -\ \underline{9814} \end{array}$

VI. Multiplication

Multiply the following mentally and put only the answers on your paper.

1. 8 x 6
2. 9 x 7
3. 12 x 10
4. 3 x 7
5. 5 x 11

VII. Copy the following on your paper and multiply.

1. $\begin{array}{r} 144 \\ \times\ \underline{307} \end{array}$
2. $\begin{array}{r} 1075 \\ \times\ \underline{33} \end{array}$
3. $\begin{array}{r} 3750 \\ \times\ \underline{234} \end{array}$
4. $\begin{array}{r} 6294 \\ \times\ \underline{176} \end{array}$
5. $\begin{array}{r} 7483 \\ \times\ \underline{4613} \end{array}$

VIII. Division

Divide the following and put only the answers on your paper.

1. 12 ÷ 3
2. 16 ÷ 4
3. 32 ÷ 8
4. 144 ÷ 6
5. 36 ÷ 6

IX. Copy the following on your paper and divide.

1. $36/\overline{180}$
2. $12/\overline{288}$
3. $8/\overline{128}$
4. $16/\overline{1920}$
5. $86/\overline{63640}$
6. $92/\overline{349671}$
7. $675/\overline{39825}$
8. $32/\overline{15200}$
9. $70/\overline{61225}$
10. $65/\overline{10595}$

Reading and Writing Whole Numbers

Lesson No. 1

OBJECTIVE: To understand the importance of being able to read and write numbers correctly.

RELATED INFORMATION:

It is important to know how to read and write numbers correctly in order to avoid errors in the trade work. It is a very common error to reverse the correct sequence of a group of numbers. In recording an order for 176 yards of fabric, a person might incorrectly write 167. Also, in writing a check, a common error is to write $2030. 00 instead of $2000. 30.

PROCEDURE:

a. In receiving an order by phone or delivered personally, always re-check all figures with the person placing the order after writing the number or amount.

b. In giving an order by phone always ask the person receiving the order to read back numbers or amounts as a re-check.

ASSIGNMENT:

1. Rewrite the following sentences using numerals where amounts are stated:

   a. Ten million, forty-three thousand, seven hundred sixty-eight pounds of woolens were received in the U. S. since January first.

   b. The Claudia Company had a net profit of forty-two thousand, seven hundred and fifty-three dollars for a three-month period.

   c. Eleven thousand shares in the Claudia Company were issued in nineteen hundred fifty-seven.

   d. At the end of thirteen weeks, net profits in the Clark Company had declined fifty and one-half percent. Net profit for that period was one hundred forty-four thousand, eight hundred and fifty-eight dollars and twenty-eight cents as compared with two hundred ninety-two thousand, six hundred forty-three dollars.

2. Read the following sentences:

    a. There are 675 dresses cut in style #101.

    b. The sales reported in 1957 by Smith and Co. totaled $22,083,628 as compared with $23,763,218 in 1958.

    c. The price for raw silk in 1958 was listed as 174,900 yen per bale.

    d. Easter business declined 23% this year with total sales at $80,892,808.

    e. An agreement which involved 93,000 workers and 2675 employers was negotiated in the dress industry.

3. Find in today's Women's Wear Daily five sentences in which numbers containing five or more figures appear. Copy the sentences that contain the largest numbers. Be prepared to read these sentences in class.

OBJECTIVE: To learn how to compute materials cost of garments. To recognize the importance of knowing the cost of items used in the manufacture of garments.

RELATED INFORMATION:

Do you think you would have a true picture of the cost of a dress if you just figured the cost of the fabric? It is important to list also and total all trimmings and notions as well as the time spent in making a dress. The cost of all fabric, trimmings, and notions used in a garment is known as the materials cost. The time element is known as the labor cost.

A manufacturer must figure all items included in making each of the different style garments he will be producing. The total cost of fabric, notions, trimmings, labor, and overhead expense determines the selling price of his dresses.

Prices are subject to change; therefore the manufacturer must keep a close check on all items purchased for each garment. This lesson deals only with materials cost.

PROCEDURE:

In figuring the materials cost of a garment, a wholesale manufacturer usually finds it best to thoroughly check with the sample garment so that all materials used will be included in the computation.

Since the fabric is usually the most expensive portion, he checks the price of the fabric used in the garment and the yardage used in the garment. In a wholesale manufacturing firm, this item is usually checked with the piece goods buyer.

He then checks the prices of all trimmings used on the garment. In a wholesale manufacturing firm, there is usually a trimmings buyer who handles all trimmings and notions and novelties other than piece goods.

ASSIGNMENT:

For this lesson you will refer to the following price list:

Spun linen		68¢	per yard
Cotton Broadcloth		56¢	per yard
Dotted Swiss		45¢	per yard
Zippers	14" O. T. (open top)	14¢	each
	12" Pl. (placket)	11¢	each
	7" Sk. Pl. (skirt placket)	10¢	each
Buttons	Pearl S. S. /36 (self-shank, line 36)	6¢	each
	Pearl S. S. /30 (self-shank, line 30)	5¢	each
Pads	Snap-in	28¢	a pair
Monograms		$1.25	each
Belts	$\frac{3}{4}$" Washable	35¢	each
	1" Washable	40¢	each
Piqué Cording		4¢	per yard
Tucking		$1.10	per yard

1. Compute the materials cost of one dress cut in each of the following styles:

   a. Style #803 (sunback)
      - 3 yards of spun linen
      - 1 14" O. T. zipper
      - 1 $\frac{3}{4}$" belt
      - 1 pair of snap-in pads
      - 3 yards of piqué cord

   b. Style #804 (sunback)
      - 3 yards of cotton broadcloth
      - 1 14" O. T. zipper
      - 1 $\frac{3}{4}$" belt
      - 5 buttons S. S. /30
      - 1 pair of snap-in pads

   c. Style #805 (shirtwaist)
      - 4 yards of spun linen
      - 1 12" Pl. zipper
      - 6 buttons S. S. /36
      - 1 1" belt
      - 1 monogram

d. Style #806 (sunback)
    4 yards of cotton broadcloth
    1 14" O. T. zipper
    1 yard of tucking
    1 $\frac{3}{4}''$ belt
    1 pair of snap-in pads

e. Style #807 (two-piece dress)
    4 yards of dotted swiss
    1 7" Sk. Pl. zipper
    4 buttons S. S. /30
    1 $\frac{3}{4}''$ belt
    $\frac{1}{2}$ yard of tucking

f. Style #808 (sunback)
    3 yards of dotted swiss
    1 14" O. T. zipper
    1 1" belt
    1 pair of snap-in pads
    2 buttons S. S. /36

2. A manufacturer made 132 dresses in style #806. How much was the total cost of materials used?

3. If 14" O. T. zippers cost 14¢ each, what would be the cost of 132 zippers used in style #806?

4. A manufacturer received two bolts of dotted swiss, each measuring 66 yards, to be used for style #807. How many dresses were cut in this style?

5. A bill for belts amounting to $96.60 was received. The delivery included styles #803 and #804. The records showed that 146 dresses were made in style #803. How many dresses were made in style #804?

6. A total of 167 monograms was received for style #805. What was the total cost of monograms at $1.25 each?

7. If snap-in pads cost 28¢ a pair, what would be the cost of the 189 pairs used in style #808?

Entering and Totaling Customers' Orders

OBJECTIVE: To learn the method of entering and totaling customers' orders.

RELATED INFORMATION:

Before a manufacturer decides on the quantity of dresses, suits, or coats to be made, he must know the number of garments ordered. To do this he must keep a clear, simple record of all garments ordered by customers. Every garment ordered must be recorded in some way.

Let us say that you are a manufacturer who cut 100 dresses of style #803. In checking, you find that only 30 of the 100 dresses were actually sold to customers. This is definitely not a "running number". You can see the loss you would suffer if each of the 70 unsold dresses cost you $10.00 each to manufacture.

Since these records will be handled daily throughout a complete manufacturing season, it is most important that they be entered on sturdy paper. One of the most common forms for entering customers' orders is made of oak tag. It is commonly known as the style card. The following information should be recorded on these style cards:

a. The style number. Each style card records a single style.

b. Short description of each style to easily identify it.

c. Date of customer's order.

d. Name of customer.

e. Date order is due to be shipped.

f. Sizes and colors ordered.

The following example of an order placed by a customer has been entered on a typical style card reprinted in this lesson.

Jones & Co. of Norfolk, Virginia placed the following order
on June 4th, 1958, to be shipped within two weeks:
Style #808
Blue: 1 size 12, 3 size 16 (written as 1/12, 3/16)
Red: 2 size 14, 5 size 18 (written as 2/14, 5/18)
Pink: 6 size 10, 2 size 20 (written as 6/10, 2/20)

Dotted Swiss

DESCRIPTION Sunback STYLE NO. 808

Date	NAME	Date Due		COLOR Blue						COLOR Red						COLOR Pink						COLOR						COLOR					
1958				10	12	14	16	18	20	10	12	14	16	18	20	10	12	14	16	18	20	10	12	14	16	18	20	10	12	14	16	18	20
June 4	Jones & Co.	6/18			1		3					2		5		6					2												

PROCEDURE:

Upon receipt of customers' orders, enter the necessary information on style cards. Remember that there is a style card for each style number.

ASSIGNMENT:

Enter on the proper style cards the following orders received during the month of June. All orders were placed with the understanding that shipment would be made within three weeks.

1. The following orders were received on June 2, 1958:

Becks Shop of Charleston, S. C. ordered

Style #803	Blue	2/12	2/16	1/20
	Pink	2/10	3/12	3/14
	Aqua	2/10	2/12	2/16

Snead & Co. of Salem, Mass. ordered

Style #804	Navy	1/10	2/12	3/14	3/16	1/18
	Brown	2/14	2/16	1/18		
Style #803	Blue	1/10	2/12	2/14	1/16	

2. The following on June 4th:

Margarets of Miami, Fla.

Style #803	White	3/10	2/12	2/14	2/16		
	Maize	2/10	2/12	2/14	2/16		
Style #804	Beige	1/10	2/12	2/14	1/16		
	Black	1/10	2/12	3/14	3/16	2/18	1/20

Mrs. Satterwath of Richmond, Ind.

Style #804	Brown	1/10	2/12	4/14	5/16	3/18	1/20
	Navy	2/12	3/14	3/16	2/18	1/20	
	Black	1/10	2/12	2/14	2/16	1/18	
Style #806	Navy	1/10	2/12	2/14	2/16	1/18	
	Brown	1/12	2/14	3/16	1/18		
	Beige	1/10	3/12	3/14	2/16		

Cunninghams of Palm Springs, Calif.

Style #803	Blue	2/10	2/12	4/14	4/16	4/18	1/20
	White	3/10	4/12	6/14	6/16	1/18	
	Aqua	2/10	2/12	4/14	4/16		
Style #805	Maize	1/10	2/14	1/18			
	Aqua	1/12	1/14	1/16	1/18		

Gay-Nell of Wilmington, Delaware

Style #803	Pink	3/10	5/12	6/14	6/16	1/18
	Aqua	1/10	1/12	3/14	3/16	2/18
	Blue	3/12	2/14	2/16	2/18	

3. The following on June 9th:

Monroe Shop of Richmond, Virginia

Style #806	Navy	1/10	2/12	1/14	3/16	1/18	
	Brown	1/10	3/12	2/14	3/16		
	Beige	2/10	2/12	3/14	4/16		
	Black	1/10	2/12	4/14	5/16	2/18	1/20
Style #804	Beige	1/10	1/12	2/14			
	Black	2/12	3/14	2/16	1/18	1/20	

The French Shop of Clearwater, Fla.

Style #805	Blue	1/10	2/12	3/14	3/16	1/18
	Pink	2/12	2/14	1/16	1/18	
	Maize	1/10	1/12	1/14	1/16	1/18
	Aqua	2/12	2/14	1/16	1/18	
Style #806	Navy	1/12	3/14			
	Brown	1/12	2/14	1/18		
	Black	1/12	2/14	3/16	1/18	1/20

Helen's Town & Country of Chicago, Ill.

Style #803	Maize	1/10	2/12	3/14	2/16
	White	2/12	4/14	2/16	1/18
Style #805	Maize	2/12	1/14	2/16	
	Aqua	1/10	2/14	1/16	1/18

Jeannettes of Woodbridge, N. J.

Style #807	Blue/white dot	2/10	2/12	3/14	3/16	1/18
	Navy/red dot	1/10	1/12	1/14	1/16	1/18
Style #803	Maize	1/12	1/18			
	White	2/14				
	Aqua	3/14	3/16	2/18	1/20	

4. On June 11th, the following:

Mary Rose Fashions of Montclair, N. J.

Style #807	Pink/wht	1/10	2/12	3/14	2/16	1/18
	Blue/wht	1/10	1/12	1/14	1/16	1/18
	Wht/blue dot	2/10	2/12	2/14	2/16	
Style #804	Navy	3/14	4/16	3/18	2/20	
	Brown	2/14	3/16	2/18	1/20	

Maison Lilliane, Kingston, N. Y.

Style #807	Wht/blue dot	1/10	1/12	2/14	2/16	1/18
	Pink/wht dot	2/10	2/12	2/14	2/16	
	Navy/red dot	1/10	1/12	1/14	1/16	1/18
Style #804	Navy	3/12	4/14	4/16	3/18	2/20
	Brown	1/12	3/14	4/16	3/18	1/20
	Beige	1/10	1/12	1/14	1/16	1/18
	Black	1/12	2/14	2/16	1/18	

The Ideal Dress Shop of Greenville, S. C.

Style #803	Blue	2/12	2/14	3/16	3/18	1/20
	Maize	2/10	4/12	3/14	1/16	1/18
	Pink	2/12	3/14	1/18		
	White	2/12	2/16			
Style #805	Blue	1/12	1/16	1/18		
	Pink	1/14	1/16	1/18		
	Maize	1/12	2/14	1/16		

5. On June 13th:

Claudia Dress Shop of Elizabeth, N. J.

Style #804	Navy	1/10	2/12	3/14	3/16	2/18	1/20
	Brown	1/12	3/14	3/16	2/18	1/20	
	Black	1/12	1/14	1/16			
Style #807	Wht/blue dot	2/14	2/16	1/18			
	Pink/wht dot	2/12	1/16				

Crossroad Shop of Freehold, N. J.

Style #805	Blue	1/10	1/14	1/18		
	Pink	1/12	1/14	1/16		
	Maize	1/10	1/12	2/14	1/16	1/18
	Aqua	1/10	1/12	2/14	1/16	
Style #807	Blue/Wht	1/10	1/12	1/14	1/16	1/18
	Navy/red	2/12	2/16			
	Pink/wht	1/10	1/12	2/14	2/16	

Toni's Town & Country of Ft. Lauderdale, Fla.

Style #803	Pink	3/12	3/14			
	Maize	1/10	3/12	4/14	2/16	1/18
	White	1/12	1/14			
Style #805	Blue	1/12	2/14	2/16		
	Pink	1/10	1/12	2/14	1/18	

6. On June 17th:

Franklins of Madison, Wisconsin

Style #804	Navy	1/12	4/14	4/16	2/18	1/20
	Brown	1/12	3/14	3/16	1/18	1/20
	Beige	1/12	1/14	1/16		
	Black	1/14	2/16	1/18		

Lillian's of Baltimore, Maryland

Style #803	Pink	1/12	1/14			

The Dress Fair of Toms River, New Jersey

Style #804	Navy	1/12	2/14	2/16	1/18	2/20
	Black	1/16	1/20			
	Brown	1/12	2/14	4/16	1/18	

The Emporium of Pittsburgh, Pa.

Style #804	Navy	2/16	2/18	1/20		
	Brown	2/14	2/16	1/18	1/20	
	Beige	1/12				
Style #806	Brown	1/10	2/12	2/14	1/16	
	Beige	1/10	1/12	2/14	2/16	1/18
	Black	1/12	1/14	2/16	1/18	

Hollywood Dress Shop of Washington, D. C.

Style #804	Brown	2/16	1/18	1/20		
	Beige	1/12	1/14			
Style #805	Pink	1/12	2/14	1/16		
	Maize	1/12	2/14	1/16		
	Aqua	1/12	2/14	1/16	1/18	

The Little Shop, Bayshore, Long Island, N. Y.

Style #806	Navy	1/10	1/12	1/14	1/16	1/20
	Brown	1/12	1/14			
	Beige	1/14	1/16	1/18		
	Black	1/12	1/14	2/16		
Style #807	Blue/wht	1/10	2/12	1/14	1/16	1/18
	Navy/red	1/12	2/14	2/16	1/18	
	Wht/blue	2/14	2/16	1/18		

Young Modern Dress Shop, Trenton, N. J.

Style #805	Blue	1/10	1/12	1/14	1/16	1/18
	Pink	1/12	2/16			
	Maize	1/10	2/14	1/18		
	Aqua	2/12	1/16			
Style #807	Blue/wht	1/12	2/14	2/16	2/18	
	Navy/red	1/10	1/12	3/14	3/16	2/18
	Wht/blue	1/10	1/12	1/18		
	Pink/wht	1/12	2/16			

Estimating Quantities of Materials Needed

OBJECTIVE: To learn how to estimate yardage and trimmings needed. To practice cross or horizontal addition.

RELATED INFORMATION:

After the record is made on style cards of all garments ordered by customers, it is important to estimate the fabric yardage and total trimmings needed to manufacture these garments.

Working with the style cards, as used in Lesson 3, the total quantity ordered is transferred to a "cutting ticket". The cutting ticket is usually a small paper form totaling the number of garments to be cut in each size and color of each style. The following information must appear on the cutting ticket:

a. Date total is taken after all orders are entered on style card.
b. Style number.
c. Colors ordered.
d. Sizes ordered.
e. Total quantity of each color.

The horizontal total of each color is then multiplied by the average yardage per dress to obtain the fabric yardage estimate. All other items needed to complete the garments are estimated in the same way. Workers in needle trades must be able to add horizontally as quickly as vertically.

On page 16 is a sample of a cutting ticket used in the trade.

PROCEDURE:

a. Total the number of garments ordered in sizes and colors on style cards.
b. Transfer style numbers, colors, and sizes ordered to a cutting ticket.
c. On the cutting ticket total horizontally the number of garments in each color.
d. Total number of garments in each size. The totals of (c) and (d) must be the same.
e. Estimate fabric needed in each color, using yardages listed in Lesson No. 2.
f. Estimate trimmings needed for each style as listed in Lesson No. 2.

CUTTING TICKET

Date cut June 25, 19—

Style 714

Date June 20, 19—

Cutter

	COLOR	10	12	14	16	18	20	34	36	38	40	42	44	46	TOTAL
	White	2	7	15	21	19	12								76
	Blue	3	8	21	25	21	14								92
	Pink	2	7	14	19	17	6								65
	Maize	1	5	6	12	10	4								38
															271 dresses
		8	27	56	77	67	36								

ASSIGNMENT:

1. Add without writing in a column:

   a. 100 + 75 + 28 + 32 + 67 + 59

   b. 18 + 628 + 187 + 14 + 195 + 65

   c. 107 + 223 + 16 + 104 + 87 + 365

   d. 100 + 200 + 400

   e. 27 + 99 + 36 + 14

2. Add both ways and check:

   a. 5 + 14 + 8 + 20

   b. 3 + 4 + 7 + 8

   c. 10 + 15 + 16 + 14

   d. 9 + 8 + 20 + 14

   e. 11 + 31 + 70 + 18 +64

   f. 94 + 19 + 17 + 18 + 25

   g. 24 + 32 + 83 + 8 + 13

   h. 7 + 16 + 64 + 9 + 12

   i. 5 + 6 + 7 + 20 + 22

3. Total quantity of garments ordered in each style as shown on style cards used in Lesson No. 3.

4. Transfer the quantity of garments ordered to cutting tickets.

5. Total horizontally the number of garments in each color.

6. Total the number of garments in each style.

7. Check cross addition.

8. Which style would you consider the best "running number"?

9. Estimate yardage needed for each style using figures in problem 1 of Lesson No. 2.

10. Estimate total trimmings needed for all styles, using the figures in problem 1 of Lesson No. 2.

11. How many buttons must be ordered for 435 garments, if each garment requires 12 buttons for the front and 2 for the pockets?

12. A dress requires 13 buttonholes. How many buttonholes will be made on 379 dresses?

OBJECTIVE: To learn how to keep daily package-receipt records.

RELATED INFORMATION:

In order to keep an accurate record of all merchandise received, one of the first steps necessary is to receipt all bills that accompany packages. It is important that you pay only for what you receive. Packages can be misplaced and you may still be charged for them. Everything that is delivered to a manufacturing firm must be recorded in some way.

A common practice among businesses, whether they manufacture ready-to-wear or sell ready-to-wear, is to keep a daily package-receipt book. This receipt book can be divided into any number of columns. We will use a seven-column receipt book as shown on the following page. The following information should be recorded:

a. The date the package is received.
b. A consecutive receipt number.
c. The supplier's name.
d. The supplier's bill number, which is on the bill received with the package.
e. The number of packages received.
f. The items received.
g. The amount of the bill.

PROCEDURE:

Upon receipt of a package, no matter what size, record it in the package-receipt book.

Check the quantity received with the quantity charged for on the bill.

As a further check, the receipt number that identifies the package is then written on the face of the bill. For example, the first entry on the package receipt book page is a record of a package received on June 2nd from Belbro Brothers. The package-receipt book number is #101. This number is written on the supplier's bill which is #1644.

Claudia Designs, Inc.

PACKAGE RECEIPT BOOK

DATE	PACKAGE RECEIPT NO.	SUPPLIER'S NAME	BILL NO.	NO. OF PACKAGES	ITEM	AMOUNT OF BILL	
June 2	101	Belbro Bros.	1644	1	Zippers	1	07
2	102	Amari Textiles	14007	1	Spun	735	70
3	103	Perfect Pad Co.	50404	1	Pads	3	36
5	104	Belbro Bros.	1660	2	Zippers	1	51
6	105	Fashion Belt	5608	1	belts	22	42
6	106	Goth Corrugated	03231	4	boxes	7	70
9	107	Fashion Belt	5623	1	belts	11	88
9	108	Ellen's Novelty Co.	4326	1	Cordage	13	08
9	109	Belbro Bros.	1683	1	Zippers	10	67
10	110	Belbro Bros.	1685	1	Zippers	32	88
10	111	Prince Novelty Co	5710	1	buttons	6	75
10	112	Perfect Pad Co.	57541	1	Pads	33	00
10	113	Belbro Bros.	1694	1	thread	12	20
11	114	Fashion Belt Co.	5659	1	Belts	18	00
11	115	Aimaz Pleating Co.	7026	1	Tucking	12	00
11	116	Long Paper Co.	17370	1	twine	16	80
11	117	Amari Textiles Co.	14008	2	Spun	508	82
12	118	Goth Corrugated	03401	3	boxes	5	60
12	119	Long Paper Co.	17300	2	boards	28	00
12	120	Max Felson	1041	1	belts	9	54
13	121	Art Monogram Co.	4692	1	Monograms	25	00
16	122	Perfect Pad Co.	57654	1	Pads	15	96
16	123	Amari Textile	14047	2	pique	57	00
16	124	Perfect Pad Co.	57691	1	Pads	14	32

ASSIGNMENT:

1. Why is it necessary to keep a record of every package received?

2. If, in checking receipt #114, you find you were charged with 100 belts but you received 102 belts, what would you do?

3. What is the supplier's bill number for receipt #103?

4. What type of fabric was received from Amari Textile on receipt #123?

5. Using lined paper and referring to the sample, make up a page for the package-receipt book of Claudia Designs, Inc., and make these additional entries:

    a. On June 16th one bolt of piqué was received from Amari Textile Company. The bill number was 14061; the total cost was $28.56.

    b. On June 17th, Belbro Brothers delivered 1 box of zippers. The bill number was 1755; the cost was $7.19.

    c. On June 17th a package of belts amounting to $19.98 was received from Max Felsom Company. The bill number was 5699.

    d. Belbro Brothers delivered one package of zippers on June 18th. The bill number was 1763; the total cost was $9.97.

    e. Amari Textile Company was called to rush the delivery of spun rayon, which was needed for some special dresses. On the 18th, they shipped at once two cartons amounting to $480.72; the bill number was 14096.

    f. A great amount of boxes is needed in order to ship dresses in quantity. Goth Corrugated Container Co. delivered 5 bundles of boxes on June 21st. The bill number was 03536; the total cost was $9.20.

    g. Elmer Button Company delivered one package of buttons amounting to $9.38, bill #6255, on June 21st.

    h. Bill #4655 amounting to $7.62 was received from Ellen's Novelty Company with a package of number twelve cordage, on the 22nd of June.

i. Tucking, which was needed to complete one of the most popular styles, was received on June 23rd from Aimax Pleating Company, bill #7044, amounting to $20.00.

j. There was a shortage of boxes and Goth Container Company was called to make a special delivery of three bundles of boxes. The bill was #03596 amounted to $13.00. It was received on June 25th.

k. Some customers requested personal monograms. Art Monogram Company made a delivery of one package of monograms on June 28th. Bill #4701 amounted to $22.50.

l. One package of belts was received from Fashion Belt Co. on June 28th. Bill #5911 amounted to $27.00.

m. One package of pads was delivered by Perfect Pad Company on June 29th. Bill #57703 amounted to $9.00.

n. Hirsch Company made a delivery of one package of zippers on June 29th. The bill amounted to $7.65; bill #13125.

o. An additional package of belts was received from Fashion Belt Company amounting to $6.48; bill #6083.

p. Every manufacturing firm uses printed invoices or bills. A shipment of invoice envelopes was received on June 30th from Long Paper Company amounting to $3.00; bill #17673.

6. Referring to problem 5:

   a. What entry do you have recorded for receipt #133?

   b. How many entries have you made where the item entered was zippers? List the firms who delivered zippers.

   c. List the companies from which fabric was received.

   d. What items would you consider as trimmings used on dresses listed in the entries you have made?

   e. What receipt number have you given to the delivery made by Fashion Belt Company on June 28th?

7. What would you do if you received a package without a bill?

Checking Daily Bills — Lesson No. 6

OBJECTIVE: To understand the importance of checking daily bills and monthly statements.

RELATED INFORMATION:

What would you think of a dressmaker who kept a package-receipt book, but neglected to check the quantities charged on the bill with what she actually received? What would you think of a person who neglected to check the amount received with the amount she had ordered? You would probably agree that this is a poor way to conduct a business.

What would you do if you had ordered only 45 belts and received 60 belts? Remember you would be charged for these additional 15 belts on the bill. You must remember that in the needle trades there are changes every season. A dressmaker making one dress or a manufacturer making hundreds of dresses cannot afford to keep anything extra in stock unless it is a staple item.

At the end of each month, each supplier sends out a statement for the money due him. You, of course, must be able to check the amount of each bill you have received with the amount recorded on the statement of each supplier. A sample of a statement received from Belbro Brothers is shown below.

STATEMENT

FOLIO

June 30 1960

M Belbro Bros.
338 W. 37 St.

To Claudia Dress Co

TERMS: 2 % 152 W 36th St. N.Y.C.

June	2	Bill # 1644	1.07	
	5	# 1660	1.51	
	9	# 1683	10.67	
	10	# 1685	32.88	
	10	# 1694	12.20	
	17	# 1755	7.19	
	18	# 1763	9.97	
		Total		75.49

PROCEDURE:

Only one person in the firm receipts the bills.

After a bill is receipted, the package and bill are sent to the department which ordered the particular item. The following procedure is followed in each separate department.

a. Check the quantity.

b. Check the price on the bill with the price agreed at the time the order was placed.

c. Check the total amount of the bill for accuracy.

d. At the end of the month check the supplier's statements with the bills received.

ASSIGNMENT:

Note: Refer to the package-receipt entries in Lesson 5 to solve the following problems.

1. Why should the price of each item be checked before extending the total of the bill?

2. Perfect Pad Company delivered 24 pairs of pads at 18¢ a pair, bill #50404. Check the amount of the bill.

3. Ellen's Novelty Company delivered 436 yards of #12 cordage at 3¢ a yard. Check bill #4326.

4. A total of 582 belts were received from Fashion Belt Company. At 18¢ a belt, what is the total of the payment due?

5. Amari Textile Company delivered 60 yards of Birdseye piqué at 95¢ a yard. What is the total of the bill?

6. Total the bills received from Art Monogram Company as listed in the package-receipt book during the month of June. If the price of a single monogram is $1.25, how many monograms were received?

7. Referring to the sample shown in this lesson, make up statements of bills for each supplier as they would be presented at the end of the month. Total each statement.

8. Total all the bills received during the month of June.

9. Are the totalsof 7 and 8 the same amount? They should be.

10. If the #12 cordage received from Ellen's Novelty Company is 3¢ a yard, how many yards were received with bill #4655?

11. If Perfect Pad Company delivered 76 pairs of pads at 12¢ a pair, what is the price per pair of the remaining 38 pairs of pads received with bill #57654?

12. Bill #5608, received from Fashion Belt, was for 119 belts at 18¢ each. What is the total of the bill?

Computing Parcel Post Charges

Lesson No. 7

OBJECTIVE: To understand the method of computing parcel post charges for shipping merchandise.

RELATED INFORMATION:

Goods may be shipped by parcel post, railway express, airmail, air express, air freight, and truck. In the garment industry, many goods are shipped by parcel post.

Why do you suppose many kinds of goods are shipped by mail and not by freight? Shipping by mail affords a quick, convenient method of sending small packages and mail reaches more places than any other means of transportation. The special advantages of mail are the low transportation charges and the rapid delivery of goods.

Parcel post is considered fourth-class mail. The cost of sending a package by parcel post depends on the weight of the package and the distance it is to be sent. Packages to be sent by parcel post must weigh not less than 1 pound and not over 70 pounds. In determining weight for finding shipping charges, a fraction of a pound is counted as a full pound. Thus 18 ounces is counted as 2 pounds and $3\frac{1}{2}$ pounds as 4 pounds.

For determining distances in calculating postage, the country is divided into eight circular zones, with the post office from which the parcel is sent as the center of the circles. In order to find what zone a city is located in, we need to know only how far away it is. Any city within 50 miles of your post office is in Zone 1. A city between 50 and 150 miles from your post office is in Zone 2, and so on. Parcel post zone guides, published by the U.S. Post Office Department, are available for each post office unit.

On the next page you will find a copy of the Fourth Class Rates (Parcel Post Zone Rates) as of 1960.

If a package of merchandise weighs less than 16 ounces, it goes by third class mail, for which the rate is uniform regardless of the distance. The rate (1960) is 3¢ for the first two ounces and $1\frac{1}{2}$¢ for each additional ounce or fraction of an ounce.

Fourth-Class (Parcel Post) Zone Rates

Weight, 1 pound and not exceeding—	Zones							
	Local	1 and 2 Up to 150 miles	3 150 to 300 miles	4 300 to 600 miles	5 600 to 1000 miles	6 1000 to 1400 miles	7 1400 to 1800 miles	8 Over 1800 miles
2 pounds	$0. 24	$0. 33	$0. 35	$0. 39	$0. 45	$0. 51	$0. 58	$0. 64
3 pounds	. 26	. 38	. 41	. 47	. 55	. 64	. 74	. 83
4 pounds	. 28	. 43	. 47	. 55	. 65	. 77	. 90	1. 02
5 pounds	. 30	. 48	. 53	. 63	. 75	. 90	1. 06	1. 21
6 pounds	. 32	. 53	. 59	. 70	. 85	1. 03	1. 22	1. 40
7 pounds	. 34	. 58	. 65	. 77	. 95	1. 16	1. 38	1. 59
8 pounds	. 36	. 63	. 71	. 84	1. 05	1. 29	1. 54	1. 78
9 pounds	. 38	. 68	. 77	. 91	1. 15	1. 42	1. 70	1. 97
10 pounds	. 40	. 73	. 83	. 98	1. 25	1. 55	1. 86	2. 16
11 pounds	. 42	. 77	. 89	1. 05	1. 35	1. 67	2. 02	2. 34
12 pounds	. 44	. 81	. 95	1. 12	1. 45	1. 79	2. 18	2. 52
13 pounds	. 46	. 85	1. 01	1. 19	1. 55	1. 91	2. 34	2. 70
14 pounds	. 48	. 89	1. 07	1. 26	1. 65	2. 03	2. 50	2. 88
15 pounds	. 50	. 93	1. 13	1. 33	1. 75	2. 15	2. 66	3. 06
16 pounds	. 52	. 97	1. 18	1. 40	1. 85	2. 27	2. 81	3. 24
17 pounds	. 54	1. 01	1. 23	1. 47	1. 95	2. 39	2. 96	3. 42
18 pounds	. 56	1. 05	1. 28	1. 54	2. 05	2. 51	3. 11	3. 60
19 pounds	. 58	1. 09	1. 33	1. 61	2. 15	2. 63	3. 26	3. 78
20 pounds	. 60	1. 13	1. 38	1. 68	2. 25	2. 75	3. 41	3. 96
21 pounds	. 62	1. 17	1. 43	1. 75	2. 34	2. 87	3. 56	4. 14
22 pounds	. 64	1. 21	1. 48	1. 82	2. 43	2. 99	3. 71	4. 32
23 pounds	. 66	1. 25	1. 53	1. 89	2. 52	3. 11	3. 86	4. 50
24 pounds	. 68	1. 29	1. 58	1. 96	2. 61	3. 23	4. 01	4. 68
25 pounds	. 70	1. 33	1. 63	2. 03	2. 70	3. 35	4. 16	4. 86
26 pounds	. 72	1. 37	1. 68	2. 10	2. 79	3. 47	4. 31	5. 04
27 pounds	. 74	1. 41	1. 73	2. 17	2. 88	3. 59	4. 46	5. 22
28 pounds	. 76	1. 45	1. 78	2. 24	2. 97	3. 71	4. 61	5. 40
29 pounds	. 78	1. 49	1. 83	2. 31	3. 06	3. 83	4. 76	5. 58
30 pounds	. 80	1. 53	1. 88	2. 38	3. 15	3. 95	4. 91	5. 76
31 pounds	. 82	1. 57	1. 93	2. 45	3. 24	4. 06	5. 05	5. 93
32 pounds	. 84	1. 61	1. 98	2. 52	3. 33	4. 17	5. 19	6. 10
33 pounds	. 86	1. 65	2. 03	2. 59	3. 42	4. 28	5. 33	6. 27
34 pounds	. 88	1. 69	2. 08	2. 66	3. 51	4. 39	5. 47	6. 44
35 pounds	. 90	1. 73	2. 13	2. 73	3. 60	4. 50	5. 61	6. 61
36 pounds	. 92	1. 77	2. 18	2. 80	3. 69	4. 61	5. 75	6. 78
37 pounds	. 94	1. 81	2. 23	2. 87	3. 78	4. 72	5. 89	6. 95
38 pounds	. 96	1. 85	2. 28	2. 94	3. 87	4. 83	6. 03	7. 12
39 pounds	. 98	1. 89	2. 33	3. 01	3. 96	4. 94	6. 17	7. 29
40 pounds	1. 00	1. 93	2. 38	3. 08	4. 05	5. 05	6. 31	7. 46
41 pounds	1. 02	1. 97	2. 43	3. 15	4. 14	5. 16	6. 45	7. 62
42 pounds	1. 04	2. 01	2. 48	3. 22	4. 23	5. 27	6. 59	7. 78
43 pounds	1. 06	2. 05	2. 53	3. 29	4. 32	5. 38	6. 73	7. 94
44 pounds	1. 08	2. 09	2. 58	3. 36	4. 41	5. 49	6. 87	8. 10
45 pounds	1. 10	2. 13	2. 63	3. 43	4. 50	5. 60	7. 01	8. 26
46 pounds	1. 12	2. 17	2. 68	3. 50	4. 59	5. 71	7. 15	8. 42
47 pounds	1. 14	2. 21	2. 73	3. 57	4. 68	5. 82	7. 29	8. 58
48 pounds	1. 16	2. 25	2. 78	3. 64	4. 77	5. 93	7. 43	8. 74
49 pounds	1. 18	2. 29	2. 83	3. 71	4. 86	6. 04	7. 57	8. 90
50 pounds	1. 20	2. 33	2. 88	3. 78	4. 95	6. 15	7. 71	9. 06
51 pounds	1. 22	2. 37	2. 93	3. 84	5. 03	6. 26	7. 84	9. 22

Most packages sent by the garment industry are insured. In order to obtain payment for loss of, rifling of, or damage to a package mailed, it must be insured. The insurance fees follow:

Liability	Fee
$ 0.01 to $10.	$0.10
10.01 to 50.	0.20
50.01 to 100.	0.30
100.01 to 200.	0.40

Liability for insured mail is limited to $200.

There are times when a manufacturer wishes to send packages by parcel post and have the merchandise paid for at the time of delivery. The cost of the article and the cost of the postage are collected from the addressee when the article is delivered. This is collected-on-delivery service, which is usually called C. O. D. service. The amount collected is returned to the manufacturer by a postal money order. The C. O. D. fees follow:

FEES (IN ADDITION TO POSTAGE)

Liability (and COD collection to $200)	COD Fees	
	Registered (See 163.6)	Unregistered
$0.01 to $5	$0.80	$0.30
$5.01 to $10	.80	.40
$10.01 to $25	1.10	.60
$25.01 to $50	1.10	.70
$50.01 to $100	1.20	.80
$100.01 to $150	1.40	.90
$150.01 to $200	1.40	1.00
$200.01 to $300	1.50	Liability for unregistered COD mail is limited to $200; for registered COD $1,000, same as for other registered mail. Collection for COD mail, unregistered or registered, is limited to $200.
$300.01 to $400	1.60	
$400.01 to $500	1.70	
$500.01 to $600	1.80	
$600.01 to $700	1.90	
$700.01 to $800	2.00	
$800.01 to $1,000	2.10	

PROCEDURE:

A. Determine to what zone the package is being sent.

B. Weigh the package; count any fraction of a pound as a full pound.

C. Refer to rate chart in this lesson to figure parcel post charges.

D. Figure additional charges, such as C. O. D., insurance, etc.

Example: Jones & Co., of Woodbridge, N. J. is sending a package which contains 2 dresses, weighing 3½ pounds, to A. Smith, Newark, N. J. The package is valued at $31.50. Find the cost of sending this package by insured parcel post.

Since Newark is within the first zone, you would check under zone I, and in line with the four pound weight you would find a 43¢ charge for parcel post. The insurance fee is 20¢. Therefore, the total postal charges for this package amount to 63¢.

ASSIGNMENT:

1. Find the cost of sending each of these packages into the zone indicated:

Weight	Zone	Weight	Zone
a. 6 lbs.	3	e. 11 lbs.	8
b. 15 lbs.	6	f. 25 lbs.	7
c. 9 lbs.	5	g. 3½ lbs.	1
d. 5 lbs. 9 oz.	Local	h. 13 lbs. 2 oz.	4

2. If a person is sending packages from New York City, in what zone is each of these cities? (The mileage in parentheses is the distance from New York.)

a.	Atlanta, Ga.	(876 miles)	i.	Columbus, Ohio	(544 miles)
b.	Denver, Colo.	(1768 miles)	j.	Washington, D. C.	(224 miles)
c.	Seattle, Wash.	(2932 miles)	k.	Wichita, Kansas	(1428 miles)
d.	Santa Fe. N. Mex.	(1980 miles)	l.	Boston, Mass.	(217 miles)
e.	Baltimore, Md.	(186 miles)	m.	Cincinnati, Ohio	(639 miles)
f.	Richmond, Va.	(330 miles)	n.	Philadelphia, Pa.	(88 miles)
g.	Chicago, Ill.	(814 miles)	o.	Raleigh, N. C.	(497 miles)
h.	Miami, Fla.	(1336 miles)	p.	Akron, Ohio	(474 miles)

3. Find the cost of sending each of these insured packages from Woodbridge, N. J. to the cities listed. The figures in parentheses are the zone numbers.

	Weight	City	Liability	
a.	15 lbs.	Denver, Colo. (7)	$24.50	
b.	19 lbs.	San Francisco, Cal. (8)	9.75	
c.	35 lbs.	New Orleans, La. (6)	55.50	
d.	27½ lbs.	Havre, Mont. (8)	36.50	
e.	12½ lbs.	Detroit, Mich. (4)	105.50	
f.	9 ounces	El Paso, Texas (8)	97.50	
g.	2 lbs. 3 ozs.	Duluth, Minn. (5)	76.50	C. O. D.
h.	11 ounces	New York, N. Y. (1)	49.50	
i.	5 lbs.	Richmond, Va. (3)	14.75	C. O. D.
j.	12 lbs.	Madison, Wis. (5)	50.00	
k.	15 lbs.	Cleveland, Ohio (4)	50.50	
l.	13½ lbs.	Baltimore, Md. (2)	75.00	
m.	25 lbs.	Hartford, Conn. (2)	49.75	

4. The shipping department of Woodbridge Garment Company records the daily shipments made by parcel post on a "manifest." Using a manifest similar to the one on the next page, enter the shipments appearing in problem 3 and figure the total postage.

NAME OF SENDER	*Indicate type of mail* ☐ INSURED ☐ C. O. D. ☐ CERTIFIED
ADDRESS	

POSTMARK AND DATE OF RECEIPT

NUMBER OF ARTICLE		NAME OF ADDRESSEE, STREET, AND POST-OFFICE ADDRESS	Postage	Fee	Due Sender If C. O. D.	†Endorsement	R. R. Fee	S. D. Fee	*S. H. Fee	Restricted Delivery Fee Remarks
1										
2										
3										
4										
5										
6										
7										
8										
9										
10										
11										
12										
13										
14										
15										
16										
17										
18										
19										
20										

TOTAL NUMBER OF PIECES LISTED BY SENDER (*Write number here in words*)	TOTAL NUMBER OF PIECES RECEIVED AT POST OFFICE	POSTMASTER, PER (*Name of receiving employee*)	†Mark "F" if "Fragile," "P" if "Perishable," "E" if "Eggs," "EH" if "Eggs for Hatching," "B" if "Butter," "FL" if "Fragile-Liquid," and "FLU" if "Fragile–Liquid–This Side Up." *Special-handling charges apply only to fourth-class parcels. Special-delivery service also includes special-handling service.

POD Form **3877–A**
Oct. 1956

GPO: C8—16—72848-1

Short Cuts in Arithmetic

Lesson No. 8

OBJECTIVE: To gain speed in figuring and checking problems.
To develop the skill of calculating problems mentally.

RELATED INFORMATION:

It is important to be quick in figuring problems in the trade, and the ability to use short cuts is an asset.

PROCEDURE:

A. To multiply by:

1. 10 Add a zero to the multiplicand, as: 788 x 10 = 7880

2. 5 Add a zero and then divide by 2:

$$788 \times 5 = 2\overset{3940}{\overline{)7880}}$$

3. 25 Add 2 zeros to the multiplicand and divide by 4:

$$788 \times 25 = 4\overset{19700}{\overline{)78800}}$$

4. 11 Add a zero to the multiplicand and add the original number:

$$788 \times 11 = \begin{array}{r} 7880 \\ \underline{788} \\ 8668 \end{array}$$

5. 9 Add a zero to the multiplicand and subtract the original number:

$$788 \times 9 = \begin{array}{r} 7880 \\ \underline{-\ 788} \\ 7092 \end{array}$$

B. Checking addition problems

Perhaps the only way that most of you know how to check an addition problem is by re-adding the problem in the opposite direction. You are now going to learn a new way of checking an addition problem. It is called the "casting-out of nines."

Example:

$$\begin{array}{rcccccccccccccc}
4897 & & 4 & 8 & \cancel{9} & 7 & = & 19 & = & 10 & = & 1 & & & \\
2348 & & \cancel{2} & \cancel{3} & \cancel{4} & 8 & = & 8 & & & & 8 & & & \\
9572 & & \cancel{9} & 5 & \cancel{7} & \cancel{2} & = & & & & & 5 & & & \\
3644 & & \cancel{3} & \cancel{6} & 4 & 4 & = & & & & & 8 & & & \\
\underline{7856} & & \underline{7} & \underline{8} & \underline{5} & \underline{6} & = & 26 & & & = & \underline{8} & & & \\
28317 & 2 & \cancel{8} & 3 & \cancel{1} & 7 & = & 12 & = & \underline{3} & & 30 & = & \underline{3} &
\end{array}$$

Before explaining this method, is there anyone in the class who can see and explain how the above problem was checked?

The casting-out of nines can save a great deal of time in checking an addition problem, but first you must have an answer to check.

In the casting-out of nines, instead of re-adding in the opposite direction, you add the digits across (horizontally), casting out nines and zeros until you end with a single digit.

Example:

$$4 + 8 + \cancel{9} + 7 = 19 = 1 + 9 = 10 = 1$$

$$(2 + \overset{\cancel{9}}{3} + 4) + 8 \qquad = 8$$

$$\cancel{9} + 5 + (7 + \overset{\cancel{9}}{2}) \qquad = 5$$

Can you work out the remaining rows?

These single digits are then added vertically and the answer is broken down to a single digit. If your original addition was correct, the single digit in your answer will be the same as that in the last step of your check. In the problem above, 3 = 3.

ASSIGNMENT:

Exercise I. Multiply the following using short cuts:

1. 343 x 11
2. 1788 x 5
3. 770 x 5
4. 732 x 9
5. 102 x 11
6. 298 x 5
7. 722 x 11
8. 307 x 9
9. 84 x 5
10. 308 x 9
11. 6775 x 5
12. 208 x 10
13. 44 x 9
14. 676 x 11
15. 5567 x 10

Exercise II. Which of the following problems have the correct answers? Do not work the problem over. Check them by casting-out nines method.

1.

$$\begin{array}{r} 43763 \\ 98143 \\ 76214 \\ 13420 \\ \hline 231540 \end{array}$$

2.

$$\begin{array}{r} 1430 \\ 9572 \\ 6341 \\ 256 \\ \hline 17599 \end{array}$$

3.

$$\begin{array}{r} 47 \\ 23 \\ 95 \\ 41 \\ 62 \\ 58 \\ \hline 306 \end{array}$$

4.

$$\begin{array}{r} 46 \\ 95 \\ 32 \\ 14 \\ 87 \\ 73 \\ \hline 348 \end{array}$$

5.

$$\begin{array}{r} 143 \\ 256 \\ 904 \\ 82 \\ 176 \\ \hline 1571 \end{array}$$

6.

$$\begin{array}{r} 76 \\ 93 \\ 46 \\ 81 \\ 43 \\ 19 \\ \hline 358 \end{array}$$

UNIT II - FRACTIONS

Pre-Test No. 2

In this test there are some important facts you should know by this time. See if you can go through this test without an error.

EXERCISE I. Add the following:

1. $\begin{array}{r} 9\frac{1}{8} \\ 7\frac{3}{4} \\ \underline{3\frac{1}{2}} \end{array}$

2. $\begin{array}{r} 1\frac{3}{4} \\ 2\frac{1}{2} \\ \underline{6\frac{3}{4}} \end{array}$

3. $\begin{array}{r} 4\frac{3}{8} \\ 3\frac{7}{8} \\ \underline{13\frac{3}{8}} \end{array}$

4. $\begin{array}{r} 17\frac{5}{8} \\ 8\frac{1}{2} \\ \underline{3\frac{1}{2}} \end{array}$

5. $\begin{array}{r} 3\frac{1}{4} \\ 1\frac{1}{2} \\ \underline{47\frac{7}{12}} \end{array}$

6. $\begin{array}{r} 4\frac{3}{8} \\ 3\frac{1}{4} \\ \underline{3\frac{1}{2}} \end{array}$

7. $\begin{array}{r} 12\frac{1}{2} \\ 15\frac{1}{4} \\ \underline{8\frac{5}{8}} \end{array}$

8. $\begin{array}{r} 6\frac{5}{8} \\ 6\frac{1}{4} \\ \underline{6\frac{7}{8}} \end{array}$

EXERCISE II. Subtract the following:

1. $\begin{array}{r} 2\frac{1}{2} \\ \underline{-\ 1\frac{1}{4}} \end{array}$

2. $\begin{array}{r} 7\frac{3}{4} \\ \underline{-\ 3\frac{7}{8}} \end{array}$

3. $\begin{array}{r} 6\frac{3}{4} \\ \underline{-\ 1\frac{1}{2}} \end{array}$

4. $\begin{array}{r} 12\frac{7}{8} \\ \underline{-\ 3\frac{1}{2}} \end{array}$

5. $\begin{array}{r} 8\frac{1}{2} \\ \underline{-\ 1\frac{3}{4}} \end{array}$

6. $\begin{array}{r} 4\frac{5}{8} \\ \underline{-\ 2\frac{3}{4}} \end{array}$

7. $\begin{array}{r} 3\frac{1}{4} \\ \underline{-\ 1\frac{5}{8}} \end{array}$

EXERCISE III: Multiply the following:

1. $\begin{array}{r} 15 \\ \underline{1\frac{1}{3}} \end{array}$

2. $\begin{array}{r} 14 \\ \underline{2\frac{1}{8}} \end{array}$

3. $\begin{array}{r} 72 \\ \underline{\frac{1}{4}} \end{array}$

4. $\begin{array}{r} 16 \\ \underline{3\frac{1}{2}} \end{array}$

5. $\begin{array}{r} 50 \\ \underline{7\frac{1}{6}} \end{array}$

EXERCISE IV: Divide the following:

1. $1\frac{1}{2} \div \frac{1}{8}$
2. $3\frac{1}{4} \div \frac{1}{4}$
3. $3\frac{1}{2} \div \frac{1}{16}$
4. $22\frac{3}{4} \div 13$
5. $17\frac{1}{2} \div 7$
6. $\$18.25 \div 36\frac{1}{2}$
7. $2\frac{1}{2} \div \frac{3}{4}$
8. $74\frac{1}{4} \div \frac{3}{8}$
9. $288 \div \frac{1}{12}$
10. $40 \div \frac{1}{6}$

UNIT II - FRACTIONS

Review of Terms Lesson No. 1

OBJECTIVE: To review terms used in the study of fractions.

RELATED INFORMATION:

Often we talk about something that is part of something else, as a part of a yard, part of a gross, part of a dozen, part of an inch, or part of a pound. Fractions, which we will cover in this lesson, are parts of a whole thing which has been divided or broken into equal parts. Fractions are constantly being used by the needle trades worker in the problems he meets daily.

You have learned that if you divide anything into two equal parts, one of the parts is called one-half ($\frac{1}{2}$). And you remember that if you divide anything into four equal parts, one of the parts is called one-fourth ($\frac{1}{4}$). Parts like $\frac{1}{2}$ or $\frac{1}{4}$ are called fractions or fractional parts.

In this lesson the terms most commonly used will be reviewed.

PROCEDURE:

The following facts are important in the understanding of fractional terms. A fraction, as stated above, is part of a whole thing which has been divided or broken into equal parts.

The fraction is composed of two parts:

a. The number below the line in a fraction shows how many parts in the whole unit. It is called the denominator.

b. The number above the line in a fraction shows how many parts have been taken or used. It is called the numerator.

You can see that in reading fractions, you must read the numerator first and then the denominator. In the fraction $\frac{3}{8}$ - a whole unit or "1" has been divided into eight parts and three parts have been taken.

$\underline{3}$ is the numerator
8 is the denominator

ASSIGNMENT:

1. What do the following mean:

   a. $\frac{3}{4}$ b. $\frac{3}{16}$ c. $\frac{7}{8}$ d. $\frac{3}{10}$ e. $\frac{5}{6}$

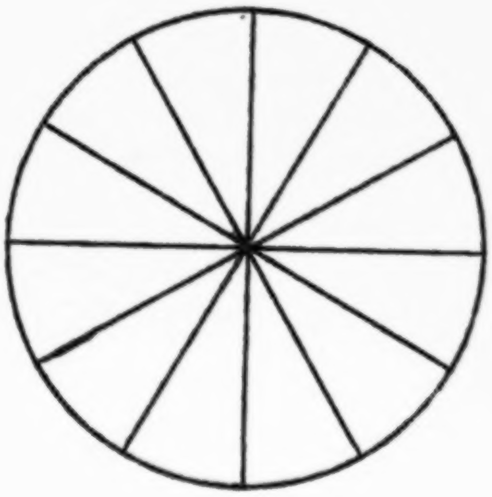
2. Write the following fractions:

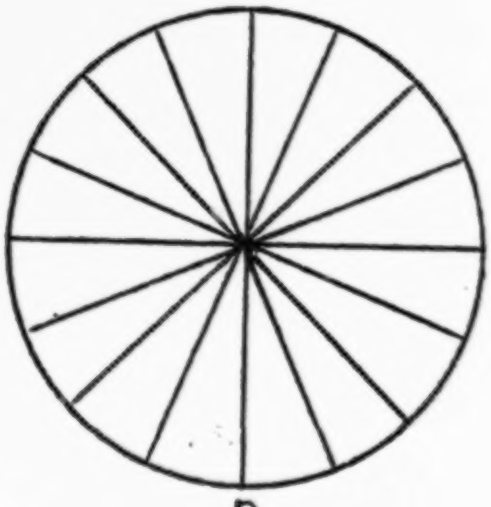
   a. four-fifths b. twenty thirty-sixths c. three-sixteenths
   d. twelve thirty-sixths e. seven-fourteenths f. fourteen-thirtieths

3. What does numerator mean and where is it found in the fraction?

4. What does the number below the line mean?

5. Into how many equal parts is circle A divided? Circle B?
   What is each one of these parts called?


A


B

6. a. There are ________ cents in a quarter.
   b. What part of a quarter is ten cents?
   c. Write this number as a fraction.

7. The following materials were used to make six different garments. Write as a fraction, the amount of material used in making one garment:

	6 garments	1 garment	Fraction
a.	24 yards of chambray	3 yards	
b.	36 buttons	4 buttons	
c.	6 zippers	1 zipper	
d.	3 spools of thread	$\frac{1}{2}$ spool	

8. a. How many months are there in one year?
b. What part of a year is 4 months?
c. What part of a year is 2 months?
d. What part of a year is 1 month?

9. Which is more, $\frac{1}{4}$ or $\frac{1}{2}$?

10. a. How many fifths are there in twenty-five? b. in a quarter?
c. What part is five of twenty-five? d. of a quarter?

11. Write the fractions of a dollar for the following amounts:

a. 25¢ b. 30¢ c. 15¢ d. 70¢ e. 60¢

12. Give the value in cents of the following fractions of a dollar:

a. $\frac{1}{10}$ b. $\frac{1}{2}$ c. $\frac{6}{8}$ d. $\frac{7}{10}$ e. $\frac{1}{5}$

UNIT II - FRACTIONS

Review of Types of Fractions

Lesson No. 2

OBJECTIVE: To recall the different types of fractions.

RELATED INFORMATION:

a. A proper fraction is a fraction whose numerator is smaller than its denominator and whose value is less than a unit. Thus $\frac{7}{12}$ and $\frac{2}{3}$ are proper fractions.

b. An improper fraction is one whose numerator is equal to or greater than its denominator, and whose value is therefore one complete unit or more than one unit. Thus $\frac{8}{8}$ or $\frac{16}{4}$ are improper fractions.

c. A mixed number is a number expressed by a whole number and a fraction combined. $1\frac{1}{4}$ is a mixed number.

We may change any improper fraction to a mixed number and any mixed number to an improper fraction.

PROCEDURE:

To change improper fractions to mixed numbers or whole units:

Example: $\frac{16}{4}$ - an improper fraction

To change an improper fraction to a mixed number or whole unit, divide the numerator (16) by the denominator (4), which will give you an answer of 4 complete units.

To change mixed numbers to improper fractions:

Multiply the whole number by the denominator and to the result add the numerator. Write the sum over the denominator of the original fraction.

Example: Suppose you have the mixed number $3\frac{1}{2}$. To change it to an improper fraction, multiply the whole number (3) by the denominator and to the result (6) add the numerator (1) which equals 7 . Write the sum (7) over the denominator of the original fraction (2). The improper fraction would be $\frac{7}{2}$.

ASSIGNMENT:

1. Classify the following according to the three types of fractions:

   a. $\frac{13}{12}$
   b. $8\frac{1}{4}$
   c. $\frac{15}{16}$
   d. $53\frac{5}{8}$
   e. $\frac{35}{50}$
   f. $74\frac{1}{4}$
   g. $\frac{7}{12}$
   h. $\frac{3}{10}$
   i. $\frac{13}{8}$
   j. $4\frac{1}{7}$
   k. $\frac{16}{5}$
   l. $3\frac{1}{2}$

2. Change the mixed numbers in problem 1 to improper fractions.

3. Change the improper fractions in problem 1 to mixed numbers.

4. The following figures indicate materials in inventory at the end of the month. (1) Give the type of fraction for each one. (2) Change the mixed numbers to improper fractions.

			Type	Change
a.	Spun Linen	$45\frac{7}{8}$ yds.		
b.	Broadcloth	$25\frac{3}{8}$ yds.		
c.	Dotted Swiss	$34\frac{3}{4}$ yds.		
d.	14" O. T. Zippers	$1\frac{1}{12}$ gr.		
e.	12" Pl. Zippers	$\frac{5}{12}$ gr.		
f.	7" Pl. Zippers	$\frac{1}{6}$ gr.		
g.	S. S./30 Pearl Buttons	$6\frac{5}{6}$ gr.		
h.	S. S. /36 Pearl Buttons	$1\frac{3}{4}$ gr.		
i.	Pins	$2\frac{1}{2}$ lbs.		
j.	Thread	$\frac{3}{12}$ doz.		

5. Change the following improper fractions to whole numbers or to mixed numbers:

   a. $\frac{13}{3}$
   b. $\frac{28}{5}$
   c. $\frac{21}{9}$
   d. $\frac{33}{8}$
   e. $\frac{14}{4}$
   f. $\frac{36}{6}$
   g. $\frac{32}{8}$
   h. $\frac{13}{5}$
   i. $\frac{17}{2}$
   j. $\frac{12}{12}$
   k. $\frac{72}{7}$
   l. $\frac{65}{11}$

6. Change to improper fractions:

   a. $5\frac{1}{8}$
   b. $5\frac{1}{6}$
   c. $12\frac{3}{8}$
   d. $9\frac{3}{9}$
   e. $3\frac{2}{5}$
   f. $11\frac{5}{36}$
   g. $6\frac{1}{3}$
   h. $17\frac{5}{18}$

UNIT II - FRACTIONS

Reduction of Fractions

Lesson No. 3

OBJECTIVE: To develop skill and accuracy in the reduction of fractions.

RELATED INFORMATION:

Changing the form of a fraction without changing its value is called reducing the fraction. Thus, when we change $\frac{2}{4}$ to $\frac{1}{2}$ we are reducing the fraction without changing its value. It is important that you be able to reduce and handle fractions, since this work is basic to a great part of the needle trades.

Proper fractions like $\frac{1}{16}$, $\frac{3}{16}$, $\frac{5}{16}$, and $\frac{7}{8}$ are said to be in their lowest terms. That is, both the numerator and the denominator cannot be further reduced by dividing each of them by the same number. When in this condition they are also referred to as being in their simplest form.

Such fractions as $\frac{2}{4}$, $\frac{12}{16}$, $\frac{18}{64}$ are not in their lowest terms nor in their simplest form because each may be further reduced by dividing both terms (numerator and denominator) by a number which will be exactly contained in them. This exact divisor is called a factor, and because it is common to both terms it is known as a common factor of these terms.

Both the numerator and the denominator of $\frac{2}{4}$ may be divided by 2. This number 2, therefore, is a common factor of these terms. The division reduces both terms of the fraction by changing the numerator to 1 and the denominator to 2, making the fraction read $\frac{1}{2}$ instead of $\frac{2}{4}$. This process is known as factoring.

Although the form of this fraction has been changed by this reduction, its value has not changed. To illustrate this further: $\frac{2}{4}$ of an inch equals $\frac{1}{2}$ of an inch; $\frac{2}{4}$ of 1 yard equals $\frac{1}{2}$ of a yard. In like manner $\frac{12}{16}$, and $\frac{18}{64}$ when reduced to lowest terms become $\frac{3}{4}$ and $\frac{9}{32}$ respectively. Here again the form of the fraction has been changed but the value has not changed. A fraction should always be expressed in its simplest form. That is, the the numerator and the denominator should be reduced as much as possible by dividing both terms by common factors as explained above.

PROCEDURE:

A. To reduce a proper fraction, the numerator and the denominator are divided by a number which will go into each evenly.
Example:

$$\frac{4}{8} \div \frac{4}{4} = \frac{1}{2}$$

B. To reduce an improper fraction to a whole number or to a mixed number divide the numerator by the denominator.
Example:

$$\frac{3}{2} \qquad \begin{array}{r} 1\frac{1}{2} \\ 2\overline{)3} \end{array}$$

C. To change a mixed number to an improper fraction, multiply the whole number by the denominator of the fraction, and then add to this amount the numerator of the fractional part of the mixed number. Write the resulting number over the same denominator.
Example:

$$5\frac{3}{8} \qquad 5 \times 8 = 40 + 3 = \frac{43}{8}$$

ASSIGNMENT:

1. Reduce each of the following fractions to its lowest terms:

a. $\frac{12}{15}$
b. $\frac{15}{21}$
c. $\frac{14}{28}$
d. $\frac{18}{24}$
e. $\frac{24}{36}$
f. $\frac{27}{45}$
g. $\frac{9}{36}$
h. $\frac{60}{144}$
i. $\frac{6}{36}$
j. $\frac{12}{36}$
k. $\frac{25}{35}$
l. $\frac{10}{16}$
m. $\frac{35}{50}$
n. $\frac{12}{144}$
o. $\frac{67}{72}$
p. $\frac{16}{32}$

2. Change to improper fractions:

a. $6\frac{1}{2}$ b. $9\frac{1}{3}$ c. $3\frac{11}{12}$ d. $12\frac{3}{4}$ e. $3\frac{7}{16}$

3. Write as a whole number or a mixed number:

a. $\frac{9}{8}$ b. $\frac{24}{4}$ c. $\frac{36}{8}$ d. $\frac{13}{13}$ e. $\frac{31}{12}$

4. Change each fraction to the denominator named:

a. $\frac{3}{8}$ to $\frac{\quad}{16}$
b. $\frac{11}{16}$ to $\frac{\quad}{32}$
c. $\frac{2}{3}$ to $\frac{\quad}{12}$
d. $\frac{3}{4}$ to $\frac{\quad}{16}$
e. $\frac{7}{12}$ to $\frac{\quad}{144}$
f. $\frac{12}{16}$ to $\frac{\quad}{8}$
g. $\frac{8}{32}$ to $\frac{\quad}{4}$
h. $\frac{1}{8}$ to $\frac{\quad}{72}$
i. $\frac{12}{72}$ to $\frac{\quad}{144}$
j. $\frac{1}{4}$ to $\frac{\quad}{12}$
k. $\frac{5}{8}$ to $\frac{\quad}{32}$
l. $\frac{3}{9}$ to $\frac{\quad}{36}$

5. a. $\frac{2}{8}$ of a yard equals ________ of a yard

b. $\frac{32}{4}$ quarts of oil equals ________ qts. of oil

c. $\frac{12}{144}$ gross buttons equals ________ gr. buttons

d. $\frac{6}{16}$ lbs. of pins equals ________ lbs. of pins

e. $\frac{20}{16}$ of an inch equals ________ inches

f. $\frac{6}{8}$ of an inch equals ________ of an inch

g. $\frac{13}{8}$ of an inch equals ________ inches

h. $\frac{31}{8}$ yards equals ________ yards

OBJECTIVE: To review work in addition and subtraction of fractions. To learn how these processes are used in the trade.

RELATED INFORMATION:

Fractions cannot be added or subtracted unless they have the same denominator. When a group of fractions have the same denominator, they are said to have a common denominator. When we have a group of fractions that do not have a common denominator, we must obtain one before we can add or subtract them.

One of the basic rules of mathematics is "only like things or parts of like things may be added or subtracted." Thus, $\frac{1}{2}$ yard cannot be added to $\frac{1}{3}$ pound. In adding or subtracting parts of like things, as $\frac{1}{8}$ of a yard, $\frac{1}{6}$ of a yard, and $\frac{1}{4}$ of a yard, not only must the things (yards in this case) be alike, but the parts of the thing must be expressed in fractions having the same denominator.

Here we find that 24 can be used as a common denominator.

Example: $\frac{1}{8}$ yard $= \frac{3}{24}$

$\frac{1}{6}$ yard $= \frac{4}{24}$

$\frac{1}{4}$ yard $= \frac{6}{24}$

PROCEDURE:

If you can't readily find the least (smallest) common denominator by examination, the following method can be used.

To find the least common denominator in the following problem:

$$\frac{3}{8} + \frac{5}{6} + \frac{3}{4} + \frac{7}{10}$$

a. Set the denominators down in a horizontal row as shown.

$$\begin{array}{r|rrrr} 2 & 8 & 6 & 4 & 10 \\ \hline 2 & 4 & 3 & 2 & 5 \\ \hline 2 & 2 & 3 & 1 & 5 \\ \hline & 1 & 3 & 1 & 5 \end{array}$$

b. Divide by the smallest factor common to two or more of them. This process is continued until no two of the remaining numbers can be divided by a common factor. Since 3 and 5 have no common factor, they remain the same.

c. After all possible divisions have been completed, multiply all the numbers along the outside of the box.
Ex: $2 \times 2 = 4 \times 2 = 8 \times 1 = 8 \times 3 = 24 \times 1 = 24 \times 5 = 120$.
120 is the least common denominator.

$$\frac{3}{8} = \frac{45}{120}$$

$$\frac{5}{6} = \frac{100}{120}$$

$$\frac{3}{4} = \frac{90}{120}$$

$$\frac{7}{10} = \frac{84}{120}$$

$$\frac{319}{120} \qquad 120\overline{)319} \qquad 2\frac{79}{120}$$

d. The next step in adding these fractions is to change them to equivalent fractions having 120 as their new denominator.
The numerator 45 is obtained by dividing 8 into 120 (= 15); $15 \times 3 = 45$. Proceeding in the same manner, we obtain 100 as numerator for the 2nd number, 90 for the 3rd, and 84 for the 4th. We now have the simple problem of adding all the new numerators and placing this sum (319) over 120 to obtain $\frac{319}{120}$. Since this is an improper fraction, we must divide 319 by 120 to get a mixed number. $(2\frac{79}{120})$

To add mixed numbers, we must find the least common denominator of the fractional portions of the mixed numbers. Thus, to add $12\frac{5}{6}$, $16\frac{7}{12}$, and $6\frac{2}{3}$, we must first find the least common denominator of

$\frac{5}{6}$, $\frac{7}{12}$ and $\frac{2}{3}$.

A close examination shows that this is 12, so these fractions are changed to fractions having 12 as a denominator.

$$\begin{array}{lll}
\frac{5}{6} = \frac{10}{12} & \quad 12\frac{10}{12} & \\
\frac{7}{12} = \frac{7}{12} & \quad 16\frac{7}{12} & \\
\frac{2}{3} = \frac{8}{12} & \quad \underline{6\frac{8}{12}} & \\
 & \quad 34\frac{25}{12} & \quad \begin{array}{r} 2\frac{1}{12} \\ 12\overline{/25} \end{array} \\
 & \quad 34 & \\
 & \quad \underline{2\frac{1}{12}} & \\
 & \quad 36\frac{1}{12} &
\end{array}$$

Adding the fractions first, the total is $\frac{25}{12}$, which is an improper fraction. Simplify this to $2\frac{1}{12}$. This is then added to 34, making a total of $36\frac{1}{12}$.

Subtraction of fractions, like addition, also requires a least common denominator.

Example: Subtract $\frac{3}{8}$ from $\frac{7}{8}$.

$$\begin{array}{r}
\frac{7}{8} \\
\underline{-\ \frac{3}{8}} \\
\frac{4}{8} = \frac{1}{2}
\end{array}$$

Example: Subtract $1\frac{3}{4}$ from $2\frac{7}{8}$

$$\begin{array}{rcl}
2\frac{7}{8} & = & 2\frac{7}{8} \\
-\ 1\frac{3}{4} & = & \underline{1\frac{6}{8}} \\
 & & 1\frac{1}{8}
\end{array}$$

ASSIGNMENT:

1. Find the least common denominator for the following fractions and add:

   a. $\frac{1}{2} + \frac{3}{4} + \frac{5}{8}$

   b. $\frac{9}{16} + \frac{3}{8} + \frac{5}{12}$

   c. $\frac{7}{12} + \frac{1}{4} + \frac{3}{8}$

   d. $\frac{3}{5} + \frac{9}{12} + \frac{17}{30}$

2. Sample pieces of fabric measuring $3\frac{5}{8}$, $4\frac{3}{4}$ and $5\frac{1}{2}$ yards were used to make dresses requiring $3\frac{1}{2}$, $4\frac{3}{4}$, and $4\frac{1}{4}$ yards. How much fabric was left?

3. Add the following:

a.	b.	c.	d.	e.
$\frac{3}{8}$	$\frac{7}{36}$	$\frac{3}{4}$	$\frac{2}{3}$	$\frac{2}{5}$
$\frac{5}{8}$	$\frac{9}{36}$	$\frac{1}{2}$	$\frac{5}{6}$	$\frac{1}{2}$
$\frac{1}{8}$	$\frac{11}{36}$	$\frac{3}{8}$	$\frac{11}{12}$	$\frac{7}{10}$

4. The following quantities of materials and notions were used in making garments ordered by customers. Find the total of each:

a. Linen: $65\frac{7}{8}$, $57\frac{3}{8}$, $35\frac{1}{4}$, $30\frac{1}{2}$ yds.

b. Buttons: $7\frac{5}{6}$, $10\frac{3}{12}$, $5\frac{1}{6}$, $11\frac{2}{3}$ gross

c. Pins: $3\frac{1}{8}$, $2\frac{1}{2}$, $\frac{3}{4}$, $4\frac{3}{16}$ pounds

5. There were $15\frac{3}{12}$ gross of buttons in inventory at the beginning of the month. During the month, $6\frac{1}{6}$ gross were used. What was left?

6. In joining two pieces of material together, a $\frac{7}{8}$ inch seam was taken. In pinking the seam, $\frac{1}{4}$ inch was trimmed. How much seam remained?

7. The fabric inventory showed that there were $155\frac{3}{8}$ yards of linen on hand. The inventory at the end of the following month showed a balance on hand of $69\frac{3}{4}$ yards. How much linen had been used?

8. The following bolts of broadcloth were used up in making a quantity of blouses: $40\frac{3}{4}$, $35\frac{7}{8}$, $31\frac{1}{2}$, $19\frac{2}{3}$, and $30\frac{1}{6}$ yards. What was the total fabric used?

9. A dressmaker needs 5 pieces of cloth measuring $4\frac{2}{3}$, $7\frac{1}{2}$, $2\frac{5}{8}$, $4\frac{3}{4}$, and $3\frac{7}{8}$ yards. How many yards of cloth should she buy?

10. From a bolt containing $30\frac{5}{8}$ yards, a clerk sold $3\frac{3}{4}$ yards. How many yards were left on the bolt?

UNIT II - FRACTIONS

Multiplication of Fractions Lesson No. 5

OBJECTIVES: To learn how the multiplication of fractions is used in the trade.
To develop skill in multiplication of fractions.

RELATED INFORMATION:

You will find many problems in needle trades that require a quick and accurate knowledge of multiplying fractions. The multiplication of fractions may be somewhat shortened by the process of cancellation. This is accomplished by striking out, or canceling, factors that are common to both numerator and denominator. How this is done is illustrated in the following problem:

Multiply: $\frac{3}{4} \times \frac{7}{12} \times \frac{8}{21}$

Working out the cancellation, the solution becomes:

$$\frac{\overset{1}{\cancel{3}}}{\underset{1}{\cancel{4}}} \times \frac{\overset{1}{\cancel{7}}}{\underset{6}{\cancel{12}}} \times \frac{\overset{\overset{1}{\cancel{2}}}{\cancel{8}}}{\underset{\underset{1}{\cancel{3}}}{\cancel{21}}} = \frac{1}{6}$$

Cancellation is really a reduction to lowest terms before multiplying takes place. This reduction is accomplished by dividing both terms of the fraction by factors that are common to each. The method of cancellation as used in the above problem is explained as follows:

Seven is a factor of 7 in the numerator and 21 in the denominator. These are "cancelled" by drawing a line through each number and placing above the numerator and below the denominator the figures which represent the number of times this factor 7 is contained in 21. Cancel the rest of the numbers in the same way.

To obtain the result of this cancellation, all uncanceled terms remaining in the numerator are multiplied together for a new numerator, and all uncanceled terms remaining in the denominator are multiplied together for a new denominator.

There are four types of operations involved in multiplying fractions. They are:

a. Multiplying a fraction by a fraction.
b. Multiplying a fraction by a whole number.
c. Multiplying a mixed number by a whole number.
d. Multiplying a mixed number by a mixed number.

PROCEDURE:

Type A: Multiplying a fraction by a fraction:

Example: $\frac{3}{4} \times \frac{1}{2} \times \frac{5}{8} \times \frac{8}{9}$

1. Cancel or reduce any numerator or denominator that can be divided by the same number.
2. Multiply the uncanceled terms remaining in the numerator for a new numerator.
3. Multiply the uncanceled terms remaining in the denominator for a new denominator.

Type B: Multiplying a fraction by a whole number.

Example: $8 \times \frac{3}{4}$

1. Change the whole number to an improper fraction.

   $\frac{8}{1} \times \frac{3}{4}$

2. Cancel terms wherever possible.
3. Multiply numerators.
4. Multiply denominators.
5. Change answer to whole number, mixed number, or proper fraction in its lowest terms.

Type C: Multiplying a mixed number by a whole number.

Example: $4 \times 3\frac{1}{2}$

1. Change the whole number and the mixed number to improper fractions.

   $\frac{4}{1} \times \frac{7}{2}$

2. If possible, cancel terms.
3. Multiply numerators.
4. Multiply denominators.
5. Change to whole number, proper fraction, or mixed number.

OR

$$\begin{array}{r} 4 \\ \times\ 3\frac{1}{2} \\ \hline 2 \\ \underline{12} \\ 14 \end{array} \qquad \begin{array}{lcr} \frac{1}{2} \text{ of } 4 & = & 2 \\ 3 \times 4 & = & \underline{12} \\ & & 14 \end{array}$$

Type D: Multiplying a mixed number by a mixed number.

Example: $4\frac{1}{2} \times 8\frac{1}{4}$

1. Change the mixed numbers to improper fractions. $\frac{9}{2} \times \frac{33}{4}$
2. Cancel where possible (none in this case).
3. Multiply numerators. $9 \times 33 = 297$
4. Multiply denominators. $2 \times 4 = 8$
5. Change to whole number, mixed number, or proper fraction.

$$\begin{array}{r} \underline{8/297} \\ 37\frac{1}{8} \end{array}$$

ASSIGNMENT:

1. Work the following problems. Be on the alert for cancellations. Reduce answers to lowest terms.

a. $\frac{1}{2} \times \frac{3}{8}$
b. $\frac{3}{16} \times \frac{1}{2} \times \frac{1}{4}$
c. $\frac{5}{16} \times \frac{2}{5}$
d. $\frac{5}{6} \times \frac{7}{12} \times \frac{9}{36}$
e. $\frac{2}{3} \times \frac{7}{12}$
f. $5 \times \frac{3}{12}$
g. $10 \times \frac{5}{6}$
h. $9 \times \frac{1}{8}$
i. $2\frac{5}{8} \times 7$
j. $5\frac{1}{2} \times 8$
k. $14 \times \frac{2}{3}$
l. $7 \times \frac{5}{8}$
m. $12\frac{1}{2} \times 8\frac{1}{4}$
n. $5\frac{1}{2} \times 6\frac{3}{4}$
o. $2\frac{1}{12} \times 1\frac{7}{8}$
p. $\frac{5}{32} \times 3$
q. $16 \times \frac{5}{12}$
r. $9 \times 3\frac{1}{8}$

2. A dressmaker has an order to make 4 dresses; $3\frac{1}{2}$ yards are needed to make one dress. How many yards will she need?

3. If it takes $1\frac{1}{4}$ hours to make a blouse, how long will it take to make 14 blouses?

4. Each scallop on the neckline of a blouse measures $1\frac{1}{8}$ inches. If there are 14 scallops, what is the measurement of the neckline?

5. One skirt requires $2\frac{3}{8}$ yards. How much yardage will a dozen skirts need?

6. Compute the following:

   a. $\frac{1}{2}$ yd. x 3 ______ yds. of fabric

   b. $\frac{1}{4}$ yard x 8 ______ yds. of bias tape

   c. 16 tucks x $\frac{1}{2}$ inch ______ inches

   d. $4\frac{1}{2}$ hours x 50 employees ______ working hours

   e. 72 x $\frac{1}{4}$ oz. balls of cording ______ ozs.

   f. $4\frac{5}{12}$ x 8 ______ gross

   g. 9 x $6\frac{1}{2}$ yards ______ yards

7. Figure the fabric yardage needed, using the following quantities and yardage per garment:

	Style #	Yds. Per Garment	Quantity to be Made
a.	101	$2\frac{1}{16}$	79
b.	105	$3\frac{1}{2}$	132
c.	107	$4\frac{1}{3}$	111
d.	110	$3\frac{5}{8}$	51
e.	111	$1\frac{3}{8}$	60

Division of Fractions **Lesson No. 6**

OBJECTIVE: To review methods for the division of fractions as used in the trade.

RELATED INFORMATION:

During the day the needle trades worker often finds it necessary to divide fractional measurements of materials, divisions of time, numbers of articles, or amounts of money.

PROCEDURE:

There are as many types of operations in division as in multiplication of fractions. In division, one basic rule applies: invert the divisor and proceed as in multiplication.

Example: $\frac{1}{2} \div 3 = \frac{1}{2} \div \frac{3}{1} = \frac{1}{2} \times \frac{1}{3} = \frac{1}{6}$

Invert the terms of the divisor (turn the fraction upside down) and then proceed as in multiplying fractions. In this method, cancellation may be used.

To divide a mixed number by a whole number or vice versa, change both numbers to improper fractions before proceeding to invert the divisor and multiply.

ASSIGNMENT:

1. Work out the following problems:

a.	$\frac{1}{8} \div 2$	f.	$3\frac{3}{4} \div 5$
b.	$\frac{3}{10} \div 5$	g.	$276\frac{5}{6} \div 8$
c.	$3 \div \frac{1}{2}$	h.	$2\frac{1}{3} \div 6$
d.	$12 \div \frac{1}{3}$	i.	$328\frac{3}{8} \div 9$
e.	$\frac{9}{16} \div 3$	j.	$328\frac{3}{4} \div 5$

2. Three-quarters of a yard divided by two equals ______

3. How many $\frac{3}{4}$ units can be obtained from a $2\frac{1}{4}$ unit?

4. Nine buttons are placed in a 12-inch space. The first and last buttons are at the ends of the cloth. Give the distance apart.

5. Give the size scallop that will result if $17\frac{1}{2}$ inches is divided into 7 scallops.

6. Thirteen hems were made in $22\frac{3}{4}$ hours. Give the average time for making one hem.

7. Work out the following problems:

   a. 12 yds. $\div \frac{1}{2}$
   b. 16 in. $\div \frac{1}{2}$
   c. 8 in. $\div \frac{1}{4}$
   d. $\frac{1}{4}$ doz. $\div 3$
   e. $\frac{1}{2}$ doz. $\div 6$
   f. $\frac{1}{2}$ yd. $\div 4$
   g. $\frac{3}{4}$ yd. $\div 2$
   h. 20 in. $\div \frac{1}{5}$
   i. 9 yds. $\div \frac{1}{3}$
   j. 12 yds. $\div \frac{1}{3}$

8. The finished length of a coat dress is $43\frac{3}{4}$ inches from the neck to hem. Plan the spacing for 14 buttons. (The first button is at the neckline and the last space is equal to the others.)

9. In trimming a gathered skirt with rickrack, a dressmaker decided to use 8 rows of evenly spaced rickrack, leaving a space above and below the rickrack. The finished length was 27 inches. What would the spacing be between the rows of rickrack?

10. How many quarter-yard pieces of ribbon can be cut from:

    a. $5\frac{3}{4}$ yd.? b. $7\frac{1}{4}$ yd.? c. $10\frac{1}{4}$ yd.?

11. How many $\frac{1}{2}$ yard banners can be made from:

    a. $6\frac{1}{2}$ yds.? b. 15 yds.? c. $11\frac{1}{2}$ yds.?

12. One-third of a dozen is how many? Are you multiplying or dividing? By what?

UNIT III - MEASUREMENT

Pre-Test No. 3

---

1. Change $103\frac{1}{2}$", 81", 88", $22\frac{1}{2}$", and 12" to yards. Add the total yardage.

2. How many yards are needed for 6 dresses, each requiring 3 yards and 14"?

3. 18" is what part of a yard?

4. List the following fractions of an inch--largest first.

   $\frac{7}{8}$, $\frac{3}{16}$, $\frac{3}{4}$, $\frac{2}{8}$, $\frac{1}{2}$, $\frac{15}{16}$

5. If a dozen buttons cost 42¢, what is the cost of one button?

6. A piece of lace insertion at 3¢ a yard costs $12.60. How many yards were in the piece?

7. What is the cost of 6 dozen pearl buttons @ $2.70 a gross?

8. At 52¢ a dozen spools, what is the cost of $2\frac{1}{2}$ gross spools of thread?

9. Find the cost of $10\frac{1}{2}$ pounds of dressmaker pins @ 30¢ a quarter pound.

10. How many pairs of pads in a shipment of 376 pads?

11. How many quarts of oil are there in $3\frac{1}{2}$ gallons?

12. If 24" of material costs 36¢, what would $1\frac{1}{2}$ yards cost?

13. True and False:

    a. 6 yards = 206 inches
    b. $4\frac{1}{2}$ inches = $\frac{1}{8}$ yard
    c. $\frac{17}{8}$ yards = $2\frac{1}{8}$ yards
    d. 4 gills = 1 gallon
    e. 8 pints = 4 quarts
    f. 40 ounces = $2\frac{1}{2}$ lbs.
    g. $\frac{1}{4}$ hour = 20 minutes
    h. ¢ means dollars
    i. 53 quarters = $13.00
    j. $\frac{5}{8} - \frac{2}{4} = \frac{3}{4}$

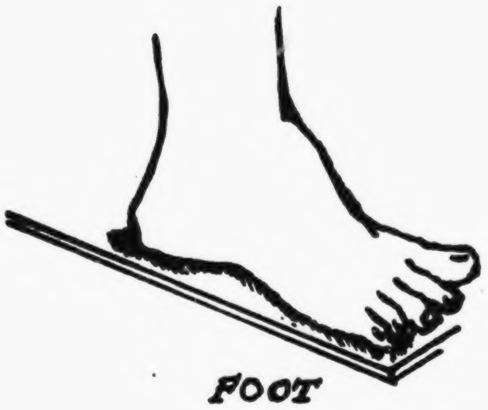
UNIT III - MEASUREMENTS

Review **Lesson No. 1**

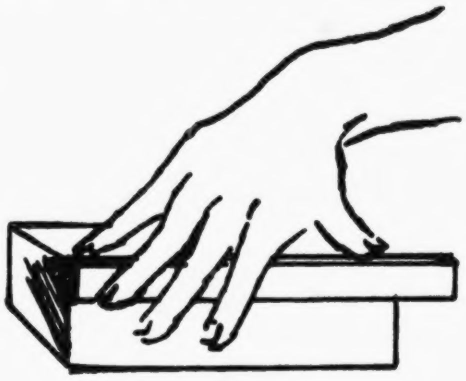
OBJECTIVE: To recall the terms necessary to the study of measurement as applied to the work in needle trades.

RELATED INFORMATION:

To measure any object means to apply some unit of measure to it. Without a system of measurement it would be impossible to carry on any kind of a business. In the garment industry, fabric, ribbons, and some notions are purchased by the yard; buttons by the gross; pins by the pound; and cleaning fluid by the gallon. It is important, therefore, to know the measures common to the needle trades and to understand how to apply them.

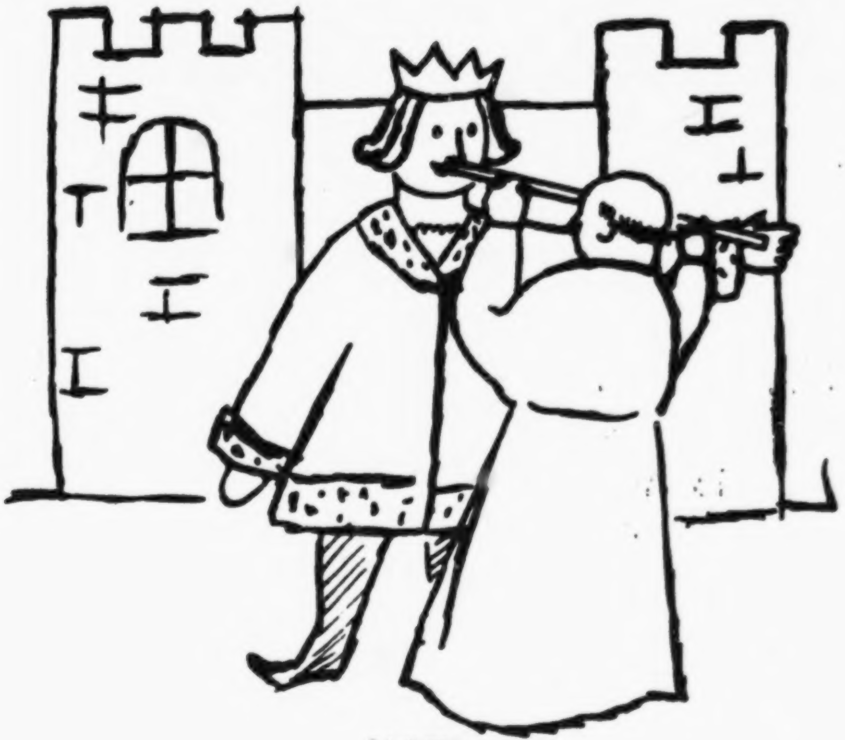


FOOT



SPAN

The idea of numbers originally started with counting on the fingers. So measurement was first connected with parts of the body. Thus we had the foot, the span, the finger, and the joints on the finger all used as units of measure. The yard was taken as the distance from the tip of the nose to the outstretched fingers. Because each town had its own standards of measure, it made a great deal of difference whether one bought a yard of cloth in Venice, in Genoa, or in London. It didn't take long to find out that one man's rule of measuring "a yard" from the tip of his nose to outstretched fingers was not the same as another's. Because of this, steps were taken to adopt standards of measure.



YARD

Any length could be used as a unit in measuring lengths. But lengths cannot be compared unless the units in measuring them are the same. Today nearly every nation has fixed standard units which everyone must use. At the Bureau of Standards in Washington, D. C., you can see the bar on which one yard is marked. The distance between two marks on the bar (at a certain temperature) is defined to be one yard.

Being able to measure length, time, weight, and other quantities helps us to make ourselves understood clearly by other people. It also cuts down on waste of time and materials.

PROCEDURE:

In using measuring tools, there are a few simple rules to be mastered.

1. To measure directly with a ruler, place the end of the ruler flush with one end of the object to be measured. Glance along the ruler to the other end of the object. Read the marking on the ruler at this point as the measurement.

2. If the end of the ruler is badly worn, it would be better to place the one-inch mark of the ruler flush with the end of the object to be measured. But then you must remember to subtract that inch from your final marking.

The following tools will be needed in this lesson:

6-inch or 12-inch ruler, yardstick, tape measure.

ASSIGNMENT:

1. Measure the width of the schoolroom using your foot as a unit of measure. Then measure it with a yardstick and compare the two measurements.

2. The first joint of the thumb is sometimes taken as one inch. Measure and see if this is so in your case. If it isn't, see if you have a joint on one of your fingers which is one inch. Use this joint to measure the length of a page in this book. Then measure the page with a ruler.

3. Measure the length of lines a, b, c.

   a. ____________

   b. ________

   c. ____________________

4. Another interesting unit of measure based on a part of the body was the digit. The digit was the size across the middle finger at the center. The digit was about $\frac{3}{4}$ inch. The width of four fingers from the waistline has been used many times for the placement of a pocket. Measure the width of your four fingers and compare this with the measurement of the distance between the waistline and the pocket in any skirt pattern or ready-made skirt available.

5. What measurements are necessary to consider if you wish to make a dress?

UNIT III - MEASUREMENT

Use of a Gauge **Lesson No. 2**

OBJECTIVES: To learn how to make and use a gauge.

To learn the importance of accuracy when working with parts of an inch.

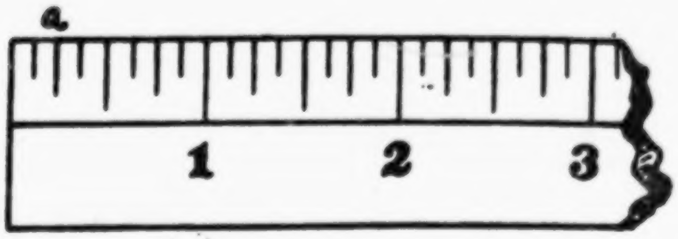
RELATED INFORMATION:

How often have you needed a small measuring tool to help you turn up a hem of a dress accurately when altering it? You probably found that a piece of cardboard cut to the measurement of the width of the hem being altered proved to be a simple and accurate tool. There are many instances when you will find a small, accurate measuring tool an aid in your shop work. The simplest and most dependable device is a gauge, which you can make for any special measurement you need. In addition to being used for measuring hems, gauges are used for measuring spaces between tucks, buttons, snaps, and pleats, and for any other operation that requires a small measuring tool. Today you will find a variety of plastic gauges on the market for these purposes.

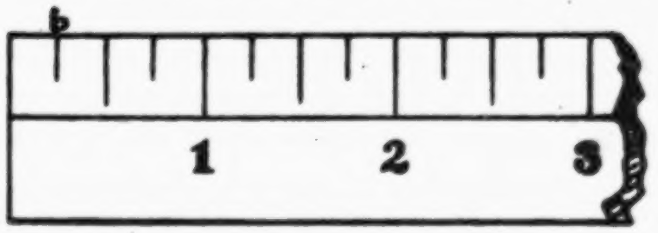
In making your own gauge, it is important to understand the parts of an inch. The inch is mankinds' oldest unit of length.

As you have learned in Unit II, we use the term fraction to mean a part of something or one or more of the equal parts of a whole thing. To do well in any job in the needle trades, you must know how to compute with fractions, especially in measurements.

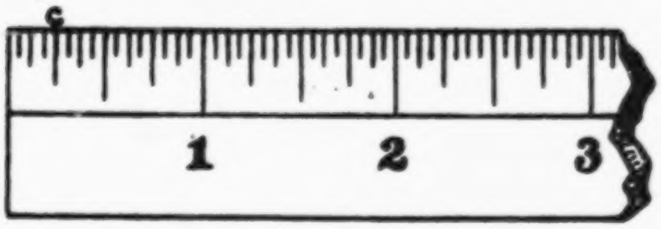
In the following drawings you can see equal parts of an inch. Note that although the three rulers are divided differently, they are all three inches long.



EIGHTHS - 1/8 INCH



QUARTERS - 1/4 INCH



SIXTEENTHS - 1/16 INCH

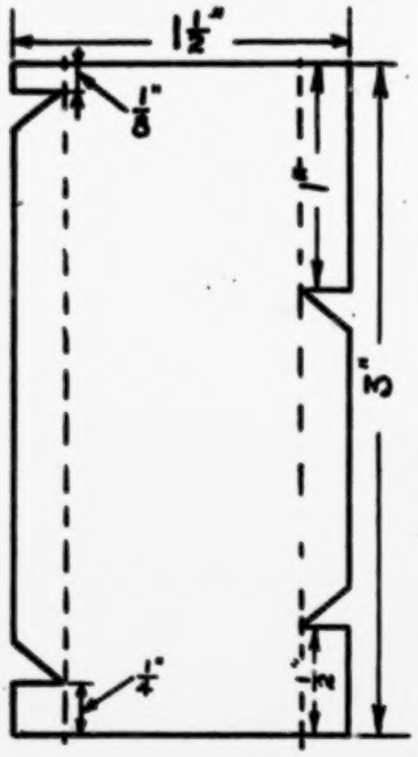
1. Into how many parts is the inch in the top drawing divided? Each part is what part of an inch? Write this fraction.

2. Into how many parts is the inch in the center drawing divided? Each part is what part of an inch? Write this fraction.

3. Into how many parts is the inch in the bottom drawing divided? Each part is what part of an inch? Write this fraction.

In checking the drawings, you can see that a, b, c, are all the same measurement even though they are $\frac{2}{8}$", $\frac{1}{4}$", and $\frac{4}{16}$".

In needle trades, the ruler or tape measure ordinarily used to measure lengths is divided into inches, and each inch is divided into either 2, 4, 8, 16, or 32 equal parts, depending upon the nature of the work that is to be measured. In making a gauge, we will work with $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$, since the work you will be doing seldom calls for measurement more accurate than $\frac{1}{16}$ of an inch.



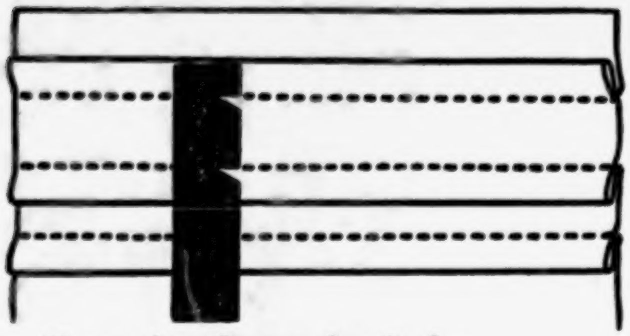
PROCEDURE:

Cut a piece of cardboard to measure 3" by 1½". Measure in ¼" from each of the long sides and draw a line parallel to each edge. Mark your measurement along this line, using the measurements from the sample gauge shown here.

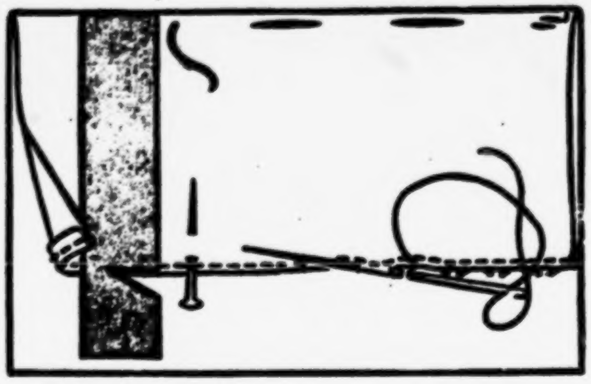
Cut in on a straight line to each mark, then clip on a slant line to notch. The distance from the corner to the straight line of the notch is the measure used.

The gauge must be very accurate, or the gauge is of no value to you.

Two Common Uses of the Gauge in Needle Trades



Measuring Gauge for Tacks



Slip-Stitched Hem

ASSIGNMENT:

1. Following the directions on the previous page, make a cardboard gauge as shown with the following measurements indicated on the gauge:

   $\frac{1''}{4}$, $\frac{5''}{8}$, $\frac{3''}{4}$, 1", and 2".

2. Make a gauge which you would use in making a hem, marking 2" and 3".

3. A dressmaker said, "Place a pin at the $\frac{3}{4}$ mark of a length of cloth."

   a. Into how many parts was the dressmaker thinking the length was divided?

   b. How many of these parts was she thinking about?

4. Would you expect the sum of $\frac{3''}{4}$ and $\frac{1''}{2}$ to be more or less than 1"? Explain.

5. Joan added $\frac{3}{4}$ and $\frac{1}{2}$ and got $\frac{4}{6}$ or $\frac{2}{3}$. Explain why $\frac{2}{3}$ is the wrong answer. What mistake did Joan make?

6. Would you expect the sum of $\frac{5}{8}$ and $\frac{1}{4}$ to be closest to $\frac{1}{2}$, 1, or $1\frac{1}{2}$? Explain.

7. Suppose you were asked to make a hem on a garment $\frac{1''}{2}$ less than the pattern was marked. The pattern marking was $\frac{15''}{16}$. Would you expect the finished hem to be closest to $\frac{1''}{4}$, $\frac{1''}{2}$, $\frac{3''}{4}$, or 1"? Explain.

8. If you were asked to trim $\frac{1''}{16}$ away from a seam that was $\frac{3''}{8}$, would you expect the remaining seam to be more than $\frac{1''}{4}$ but less than $\frac{3''}{8}$? Explain.

9. Bring illustrations of specific uses of gauges in the trade.

Linear Measure Equivalents   Lesson No. 3

OBJECTIVE: To learn the linear measure as applied to needle trades.

RELATED INFORMATION;

Linear or "long" measure is used daily in the needle trades field. Fabrics, ribbons, braids, cable cord, and many other notions cannot be handled unless you have a working knowledge of the linear table which follows:

12 inches (in. or ")	equals	1 foot (ft. or ')
3 feet	equals	1 yard (yd.)
36 inches	equals	1 yard

PROCEDURE:

List the tools that are used for measuring lengths in the needle trades room.

Measure the lengths of ribbon, fabric, zippers, rickrack, and cable cord given to you by the instructor.

Most figuring in the needle trades can be done mentally once you have a clearer understanding of the relationship of the units to each other. Since one foot is one-third of a yard, 12 inches, which equal 1 foot, is also one-third of a yard. You can also see that 36 inches, which is 3 feet, is also one yard.

ASSIGNMENT:

1. What part of a foot is one inch?
2. What is meant by a foot in terms of inches?
3. What part of a yard is one foot?
4. What is meant by a yard in terms of inches?
5. What is a yardstick?
6. What is a tape measure? How long is your tape measure?
7. The number of yards in 72" equals ______?
8. The number of inches in 3 yards equals ______.
9. The number of yards in 180 inches equals ______.
10. The number of inches in 7 yards equals ______.

UNIT III - MEASUREMENT

Use of a Yardstick **Lesson No. 4**

OBJECTIVE: To learn the fractional parts of the yardstick as used in the needle trades.

RELATED INFORMATION:

The most common tool used in the measuring of fabric and notions is the yardstick. It is divided into halves, quarters, and eighths. A garment worker seldom uses the unit foot in working with fabrics or yard goods. Perhaps the only time the term is used is in measuring work area in a factory. All fabrics received from "piece goods houses" (manufacturers or distributors of fabrics) are usually marked in eighths. Almost all measurements are spoken of in inches and yards.

Linear measure equivalents are used constantly in the trade, and all needle trades workers should know the fractional equivalents of yards in inches. The student should memorize the following parts of the yard:

36" equals 1 yard

9" equals $\frac{1}{4}$ yard

18" equals $\frac{1}{2}$ yard

27" equals $\frac{3}{4}$ yard

$4\frac{1}{2}$" equals $\frac{1}{8}$ yard

$13\frac{1}{2}$" equals $\frac{3}{8}$ yard

$22\frac{1}{2}$" equals $\frac{5}{8}$ yard

$31\frac{1}{2}$" equals $\frac{7}{8}$ yard

PROCEDURE:

Examine carefully a yardstick from the needle trades shop. You will notice that one side is marked in fractions of a yard and the other side is marked in inches divided into eighths. Using cord or ribbon, measure the following lengths:

$\frac{7}{8}$ yd., $\frac{1}{2}$ yd., $1\frac{3}{8}$ yd., $\frac{1}{8}$ yd.

Practice Mental Drill

1. **In order to save time in the adding or subtracting of fractions of a yard, the equivalent fractional form should be arrived at mentally. Practice orally the following:**

a. $\frac{1}{2}$ **yd. =** $\frac{\quad}{4}$ **yd.**
b. $\frac{1}{4}$ **yd. =** $\frac{\quad}{8}$ **yd.**
c. $\frac{1}{2}$ **yd. =** $\frac{\quad}{8}$ **yd.**
d. $\frac{3}{4}$ **yd. =** $\frac{\quad}{8}$ **yd.**
e. $\frac{6}{8}$ **in. =** $\frac{\quad}{4}$ **in.**
f. $\frac{4}{8}$ **in. =** $\frac{\quad}{2}$ **in.**
g. $\frac{1}{2}$ **in. =** $\frac{\quad}{16}$ **in.**
h. $\frac{3}{4}$ **in. =** $\frac{\quad}{16}$ **in.**
i. $\frac{1}{8}$ **in. =** $\frac{\quad}{16}$ **in.**
j. $\frac{3}{8}$ **in. =** $\frac{\quad}{16}$ **in.**
k. $\frac{5}{8}$ **in. =** $\frac{\quad}{16}$ **in.**
l. $\frac{7}{8}$ **in. =** $\frac{\quad}{16}$ **in.**

2. **Give the number of inches in each of the following:**

a. $1\frac{1}{4}$ **yds.**
b. $\frac{1}{2}$ **yard**
c. $\frac{7}{8}$ **yard**
d. $\frac{1}{8}$ **yard**
e. $\frac{3}{4}$ **yard**
f. $3\frac{1}{2}$ **yards**
g. $1\frac{3}{8}$ **yards**
h. $2\frac{2}{4}$ **yards**

ASSIGNMENT:

1. **If you purchase the following lengths of fabric, you should know the parts of a yard that they represent:**

a. $22\frac{1}{2}''$ ____________
b. **18"** ____________
c. **27"** ____________
d. $31\frac{1}{2}''$ ____________
e. **36"** ____________
f. $4\frac{1}{2}''$ ____________
g. **9"** ____________
h. $13\frac{1}{2}''$ ____________
i. **45"** ____________
j. $40\frac{1}{2}''$ ____________
k. **54"** ____________
l. **63"** ____________

2. What is the number of yards and inches in 110 inches of grosgrain ribbon?

3. Each student needs one strip of twill tape 4 inches long. How much tape will be needed for 20 students?

4. Using the rule for changing mixed numbers into improper fractions, change the following mixed numbers:

    a. $1\frac{1}{4}$ yds. to $\frac{}{8}$ yd.
    b. $3\frac{1}{2}$ yds. to $\frac{}{8}$ yd.
    c. $2\frac{3}{4}$ yds. to $\frac{}{8}$ yd.
    d. $4\frac{7}{8}$ yds. to $\frac{}{8}$ yd.
    e. $2\frac{1}{8}$ in. to $\frac{}{16}$ in.
    f. $5\frac{5}{8}''$ to $\frac{}{8}$ inches
    g. $3\frac{3}{8}''$ to $\frac{}{16}$ inches
    h. $1\frac{3}{4}''$ to $\frac{}{16}$ inches
    i. $7\frac{7}{8}$ yd. to $\frac{}{8}$ yd.
    j. $8\frac{3}{4}$ yd. to $\frac{}{4}$ yd.

5. From a $1\frac{1}{2}$ yard "cut" of dotted swiss, how many $\frac{1}{8}$ yd. strips for ruffling can be cut on the crosswise grain?

6. The yardage needed for an apron is $1\frac{1}{8}$ yds. How much material is needed for 24 aprons?

7. At the beginning of the term, the needle trades class had an order to make 32 pinafore aprons. The material needed for one pinafore was $2\frac{7}{8}$ yds. There were on hand 3 bolts of material measuring $35\frac{5}{8}$ yds., $30\frac{2}{8}$, and $30\frac{3}{8}$ yds. What were the lengths of the remnants left?

8. If 45 yards of material were used for a class of 30 students, what was the average amount used by each student?

9. If 16 inches was cut from a $1\frac{5}{8}$ yard remnant, how much remained?

10. If you bought $5\frac{3}{4}$ yards of silk shantung for a dress, and $\frac{3}{8}$ of a yard remained, how much was used?

11. In distributing bias tape, $\frac{7}{8}$ of a yard was cut from a $40\frac{1}{2}''$ piece. What part of a yard remained?

12. From a piece of cloth measuring $30\frac{3}{8}$ yards, $2\frac{1}{4}$ yards were cut at one time and $5\frac{3}{8}$ yards at another. How much was left?

13. How many children's dresses can be made from a 42-yard bolt of fabric when it takes $3\frac{1}{2}$ yards for each dress?

14. Mary Jane bought what she thought was enough fabric to make a dress. In cutting the fabric, she found she needed another half yard. The store had sold all the fabric and Mary Jane could not make the dress. What should she have done before buying the fabric?

15. How many pieces of ribbon 8" long can be cut from a bolt whose length is:

a. 10 yards b. 12 yards c. 15 yards d. 9 yards?

16. Towels require 42 inches of material. How many towels can be cut from a bolt that contains:

a. 20 yards b. 14 yards c. 15 yards d. 21 yards
e. 25 yards?

17. Dresses that require $4\frac{1}{2}$ yards are to be cut from a bolt of spun linen. How many can be cut if the bolt measures:

a. 65 yds. b. 30 yds. c. $58\frac{1}{2}$ yds. d. 81 yds.?

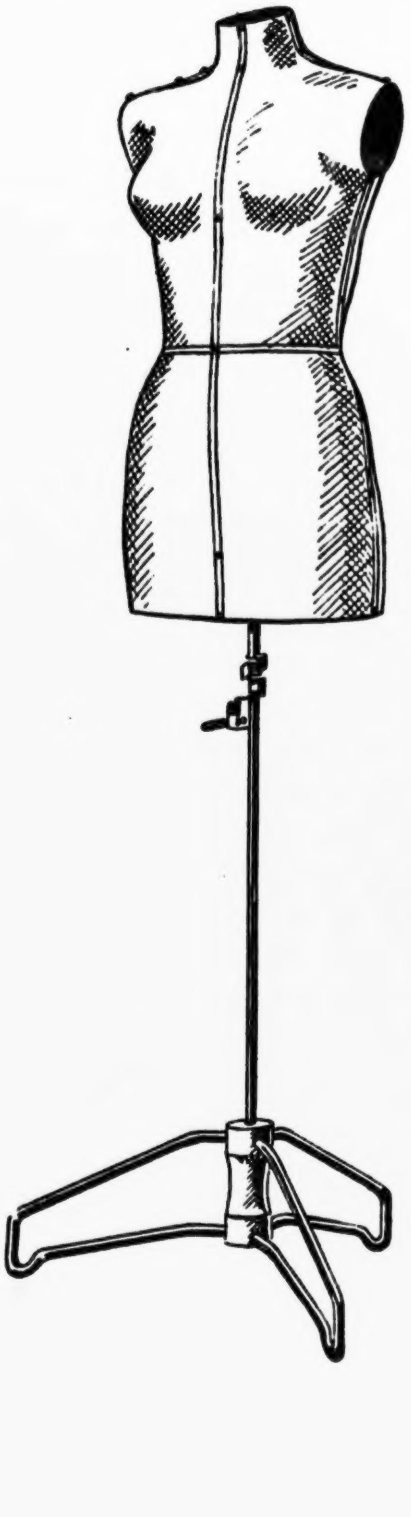
UNIT III - MEASUREMENT

Use of the Tape Measure **Lesson No. 5**

OBJECTIVE: To learn how to use the tape measure and to understand the importance of accurate measurement in achieving quality workmanship.

RELATED INFORMATION:

Accurate measurement is absolutely necessary for good trade workmanship. You wouldn't consider using a yardstick to measure your waist, but perhaps you have used a piece of cord. A much better tool for measuring the waistline is the tape measure. Measurements are reliable guides and accurate measurements are indispensable.



The tape measure is used constantly to measure irregular, curved, and straight surfaces in trade work. Tape measures come in various lengths. The one most commonly used by the needle trades is made of cloth and is 60 inches long. In your selection of a tape measure be sure it has metal ends and is marked on both sides.

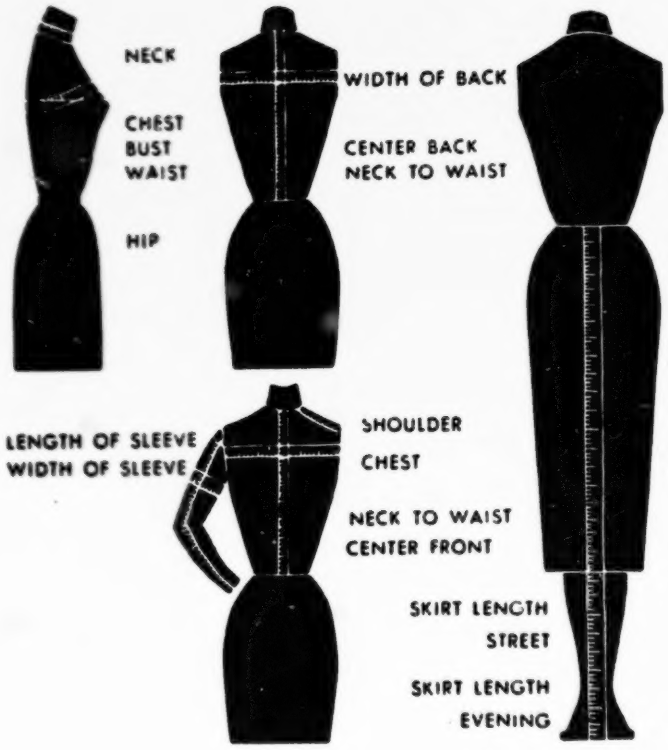
Due to the structural lines of the body, it is necessary to use a tool for measuring which will curve with these lines. Therefore, a cloth tape measure is the only measuring device that can answer the purpose. Accuracy in measuring, results in a saving of time and energy for all needle trades workers involved in the manufacturing of garments.

PROCEDURE:

Working with a tape measure, count the divisions in an inch. Name the smallest divisions of an inch on the tape measure. Compare the divisions on the tape measure with the divisions on a ruler. If you have not mastered the division of a yard, you can work out the parts of a yard using a tape measure. Since the tape measure is made of cloth, you can fold it very easily. Placing a pin at 36", which is one yard, fold the edge of the tape measure to meet the 36" mark; this will show you that 18" equals one-half yard. Dividing the tape measure in half again will show you that 9" equals one-quarter of a yard.

Having located the lines on the actual figure or dress form to be measured, the next step is to take measurements. A dressmaker taking measurements of customers must be sure the person being measured is standing erect, yet in an easy position, with the weight evenly distributed on both feet. The person taking the measurements must be accurate in placing the tape measure on the lines. She must be accurate in reading and recording the measurements. A chart for body measurements is suggested for this record.

Chest—in. taken around the body above the bust up under the arms.
Bust—in. taken around the body over the fullest part of the bust.
Waist—in. taken around the natural waistline.
Hip—in. taken around the fullest part. about 7 inches below natural waistline. or lower if necessary.


NECK
CHEST
BUST
WAIST
HIP
WIDTH OF BACK
CENTER BACK NECK TO WAIST
LENGTH OF SLEEVE
WIDTH OF SLEEVE
SHOULDER
CHEST
NECK TO WAIST CENTER FRONT
SKIRT LENGTH STREET
SKIRT LENGTH EVENING

Measurement Chart	My Measurements
BUST (around fullest part)	
WAIST (snug)	
HIP (about 7 inches below waist or fullest part)	
NECK (around base of neck)	
WRIST (not too tight)	
BACK LENGTH TO WAIST (base of neck to waistline)	
FRONT LENGTH TO WAIST (base of neck to waistline)	
SHOULDER (neck to armhole)	
WIDTH OF BACK (armhole to armhole, 4 inches down from shoulder seam)	
WIDTH OF CHEST (armhole to armhole above bust)	
LENGTH OF SLEEVE (top of arm to wrist, arm bent)	
WIDTH OF SLEEVE (around fullest part above elbow)	
BACK SKIRT LENGTH (waist to hem)	
FRONT SKIRT LENGTH (waist to hem)	

ASSIGNMENT:

1. Using a tape measure, take the measurements of a fellow student as described in the measurement chart included in this lesson.
2. Record the measurements of all dress forms used in the needle trades classes.

UNIT III - MEASUREMENT

Unit Measure **Lesson No. 6**

OBJECTIVE: To gain skill in converting various units of measure.

RELATED INFORMATION:

In the needle trades industry, the trimming buyer, operator, cutter, finisher, draper, and sample hand at one time or another meet the problem of counting units or working with units.

The trimming buyer orders all findings, notions, etc. needed to complete garments. Most of these items are sold by the unit; therefore the unit measure, which is one of the simplest to learn, is used by her daily.

Many factories manufacturing small items or inexpensive garments pay their workers by the dozen or gross. An operator or finisher can easily check her pay at the end of the week if she understands the unit measure.

Example: An operator made 110 items and the price quoted for labor was 15¢ a dozen. She received $1.20 for this work. In checking, she found she should have received $1.37.

In the designing of a garment, you will notice many items that have two similar pieces. These two pieces constitute a pair. Sleeves, cuffs, two-gore skirt fronts, two-gore skirt backs. Therefore, 12 units of the same item would be six pairs. If we had sleeves for 12 blouses this would be 12 pairs or one dozen pairs of sleeves.

PROCEDURE:

Learn the following unit measure:

2 units = 1 pair
12 units = 1 dozen (doz.)
12 dozen = 1 gross (gr.)
144 units = 1 gross (gr.)
12 gross = 1 great gross (gt. gr.)

ASSIGNMENT:

1. How many pairs of pads are there in 3 dozen? 5 dozen? 7 dozen?

2. How many dozen pockets are there in a bundle of 180? 132? 60? 108? 90? 80?

3. Express 2½ gross in terms of dozens.

4. If the U. S. manufactured 35,553,731 gross of buttons in a certain year, how many buttons were manufactured?

5. There are 6 buttons sewed on a card. Figure the number of dozens of buttons on 36 cards, on 60 cards, on 80 cards.

6. How many dozen blouses are there in a bundle of 186? 148? 120?

7. How many gross yards of red bias tape are contained in 576 yards? 720 yards? 432 yards?

8. The following orders for pads were placed by the trimming buyer: 124 pairs for style #601, 162 pairs for style #603, 86 pairs for style #607. How many pairs of shoulder pads are needed for the three styles combined? How many dozen pairs of shoulder pads?

9. How many gross of buttons are needed for the following order:

	Style #	Amount of Dresses	# of Buttons on a Dress
a.	602	284	7
b.	601	176	5
c.	604	98	4
d.	603	144	6
e.	605	242	3
f.	607	379	14
g.	609	165	10
h.	611	137	11

10. Figure the price per unit if the following items are sold by the dozen:

    a. Handbags @ $21.36 per dozen
    b. Blouses @ $19.80 a dozen
    c. Belgian beaded handbags @ $186. a dozen
    d. Stockings @ $9.00 a dozen
    e. Stretch stockings @ $10.50 per dozen
    f. Tailor's chalk @ 15¢ a dozen
    g. 4½" embroidery scissors @ $19.50 a dozen

11. Figure the price per unit if the following items are sold by the gross:

    a. S. S. /36 fresh water pearl buttons @ $4.50 a gross

    b. Full ball /16 chalk buttons @ $2.16 a gross

    c. S. S. /16 rhinestone buttons @ $3.24 a gross

    d. S. S. /36 ocean pearl buttons @ $14.00 a gross

    e. Flat center /30 self-buttons @ $1.30 a gross

UNIT III - MEASUREMENT

Liquid Measure **Lesson No. 7**

OBJECTIVE: To learn liquid measure as applied to the needle trades in the purchase of oils, cleaning fluid, etc.

RELATED INFORMATION:

You will find in working with machines that the proper oiling and care of a sewing machine are essential in order to get the best results and longest service with the least trouble and expense. You will also find that in purchasing oils for your machine the following table of measure must be understood:

Liquid Measure

4 gills = 1 pint (pt.)
2 pints = 1 quart (qt.)
4 quarts = 1 gallon (gal.)

PROCEDURE:

Memorize the liquid measure table listed above. Following is an example of one of the many problems you will meet:

If two gallons of machine oil were to be put into one-pint oil cans, how many one-pint oil cans would be needed?

Answer: 1 gallon = 4 quarts
1 quart = $\underline{2}$ pints
8 pints in one gallon
x $\underline{2}$ gallons
16 pint oil cans would be needed.

ASSIGNMENT:

1. How many quarts of cleaning fluid are there in $20\frac{3}{4}$ gallons?
2. How many gill containers will be needed to divide 4 gallons of machine oil?
3. At the beginning of the school year, one gallon of machine oil was received. During the term, one-half gallon was used. How many gills were left?

4. Cleaning fluid is sold in one-quart bottles. If the fluid is transferred to gill-size bottles for easier use, how many bottles can be filled from 3 quarts of cleaning fluid?

5. Four gills were taken from a quart can. How much liquid was left?

6. Complete the following:

a. 10 pts. of oil = ________ qts.

b. 20 gals. of water = ________ pts.

c. 120 pts. of cleaning fluid = ________ gills

d. 50 quarts of cleaning fluid = ________ gals.

e. 60 gills of carbon tetrachloride = ________ qts.

7. If one quart of cleaning fluid costs $1.35, what would one gallon cost?

The Avoirdupois Weight Measure

Lesson No. 8

OBJECTIVE: To learn the units of weight measure used in the needle trades.

RELATED INFORMATION:

In the needle trades the following materials are sold by weight: pins, paper, thread, cotton padding, etc.

A needle trades worker must know the following table of weights:

16 ounces (oz.) = 1 pound
100 pounds = 1 hundred weight (cwt.)

PROCEDURE:

Since this is a simple table to learn, you will practice the following orally:

1. How many pounds of pins are there in 32 ounces?
2. Eight-ounce boxes of pins are used in class. How many boxes are in a five-pound carton?
3. How many pounds of pattern paper are in a roll weighing one cwt.? 2 cwt.?
4. If the electric iron used in class weighs $2\frac{7}{8}$ pounds, how many ounces does it weigh?

ASSIGNMENT:

1. If at the beginning of the year two 5-pound cartons of 8-ounce boxes of pins were received, and at the end of the year there were $2\frac{1}{2}$ pounds of pins left, how many 8-ounce boxes were used?
2. How many pounds are in 42 packages each weighing 8 ounces?
3. Two rolls of pattern paper, each weighing one cwt., were ordered. Each roll was twelve pounds short. How many pounds of paper were received?

4. If our cotton mills use 3,743,089 bales of cotton in one year, weighing 1,873,074,716 pounds, what is the average weight per bale? Answer to the whole pound only.

5. Taking inventory, you find you have:

198 lbs. of heavy pattern paper
135 lbs. of marking paper
140 lbs. of separating tissue
97 lbs. of multi-clear marking paper

What is the total weight of paper on hand?

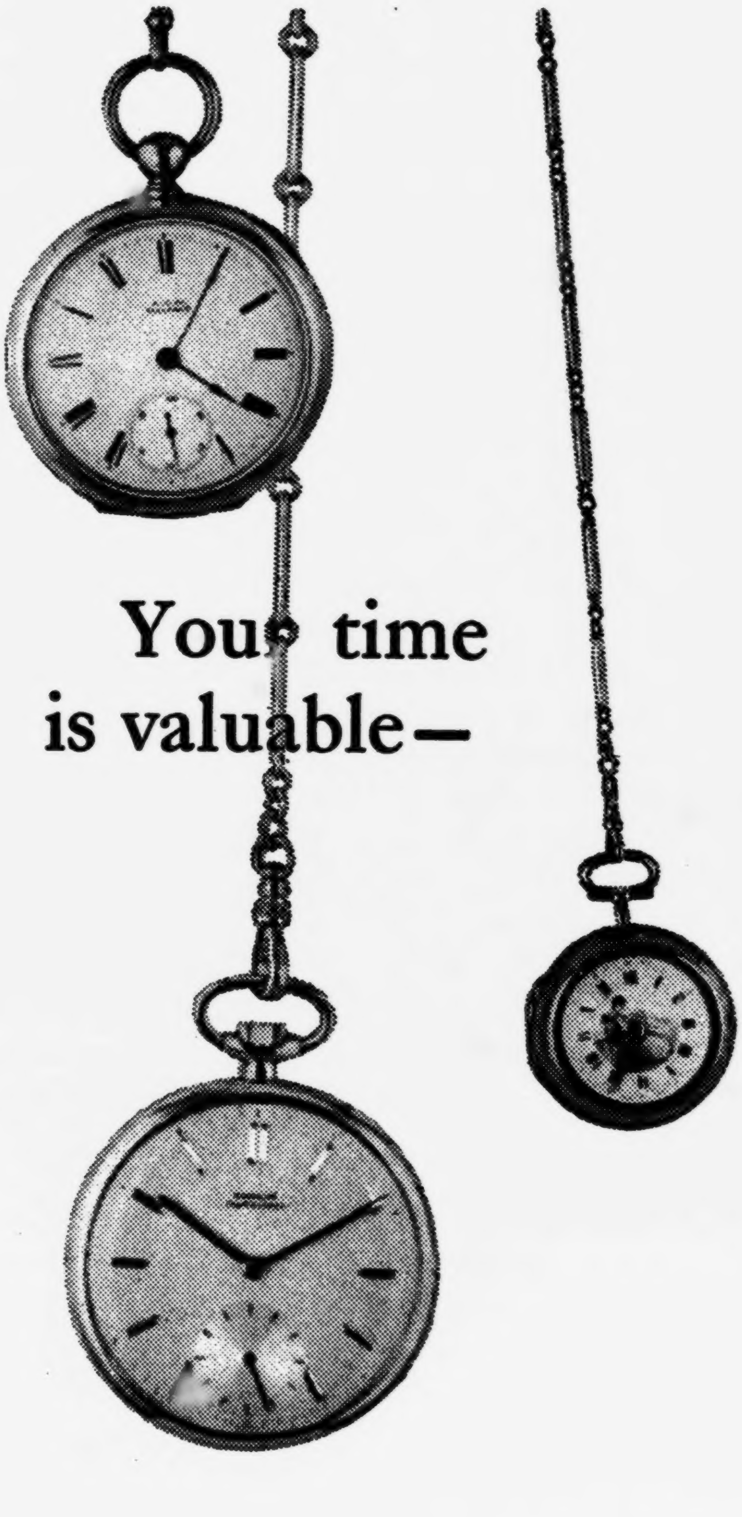
Measure of Time **Lesson No. 9**

OBJECTIVE: **To learn to handle problems involving time.**

RELATED INFORMATION:

Everyone working in the garment trade has chosen his particular job not only because he is interested in this field, but mainly to earn a living. If you are earning money now by baby sitting, doing housework, or in any other way, you know the importance of figuring how much money you should receive for your work. People do make mistakes and since "time is money," you will be the loser if you cannot figure out your own earnings.

Earnings are figured by the hour or the week (time work), or by the piece or unit (piecework).



PROCEDURE:

It is important to learn the following table of the measure of time:

60 seconds (sec.) = 1 minute (min.)
60 minutes (min.) = 1 hour (hr.)
24 hours = 1 day (da.)
7 days = 1 week (wk.)
52 weeks = 1 year (yr.)
365 days = 1 year
100 years = 1 century

In many factories, the time is mechanically recorded and shows fractions of hours. In order to check the time, one should be able to calculate fractions. The following fractional equivalents of the hour should be memorized:

$\frac{1}{4}$ hr. = 15 min.

$\frac{1}{2}$ hr. = 30 min.

$\frac{3}{4}$ hr. = 45 min.

ASSIGNMENT:

1. The girls in the trade class recorded their time in the classroom during the past week. Compute the actual time spent per week for each student listed.

Student	Mon.	Tues.	Wed.	Thurs.	Fri.
A.	9:15 11:10	9:30 11:50	9:05 11:10	9:45 11:55	9:10 11:45
B.	9:00 11:45	9:05 11:40	9:00 11:50	9:05 11:35	9:05 11:40
C.	9:15 11:40	9:20 11:50	9:25 11:40	9:05 11:05	9:10 11:15
D.	9:00 11:45	9:00 11:30	9:00 11:15	9:05 11:50	9:00 11:55

2. During the time assigned to trade work on Thursday, Jane was excused 45 minutes from class for a special Glee Club rehearsal; spent 15 minutes for a group meeting; and, due to bad weather, the class was dismissed 20 minutes early. How much time did Jane lose from her trade work that day?

3. A class was given 90 freshman pinafores to be made. It took 3 weeks of trade time (3 hrs. a day) to complete the work. There were 20 girls in the class. What was the average time for a girl to stitch one pinafore?

4. Joan took 2 trade sessions to stitch a smock. How many hours would it take for her to stitch $1\frac{1}{2}$ dozen smocks?

5. On Monday Alice began work on a child's dress at 9:15. At 10 o'clock she was called into the office and was there 45 minutes. She returned to shop and was dismissed for lunch at 11:50. How much time did Alice spend on the dress that day?

6. In most dress factories today, the work day is 7 hours long. If you started to work at 8:45 and left at 4:15, how much time was allowed for lunch?

7. An operator works 7 hours a day and each day makes an average of 8 dresses @ $\$2.08\frac{1}{4}$ a dress. She left two hours early on Monday and one hour early on Friday. What is her wage loss at the end of the week?

8. A lesson in the making of a two-piece placket took 20 minutes; the rest of shop time (3 hrs. a day) was spent in practicing that lesson. How long was the practice work at the machine that day?

Measure of Money **Lesson No. 10**

OBJECTIVE: To learn the importance of counting change correctly to avoid mistakes.
To learn the proper way to indicate amounts of money in writing.

RELATED INFORMATION:

Calculations involving the use of money enter into the daily lives of practically everyone of us whether we are students, workers, householders, or businessmen. Because of this it is very important that you have a working knowledge of elementary calculations used in buying, selling, business transactions, and places of employment.

The unit of the money system in the United States is the dollar. This is divided into small units each represented by its own coin.

The one-cent piece or penny = $\frac{1}{100}$ of a dollar

The five-cent piece or nickel = $\frac{5}{100}$ of a dollar or $\frac{1}{20}$

The ten-cent piece or dime = $\frac{10}{100}$ of a dollar or $\frac{1}{10}$

The twenty-five cent piece or quarter = $\frac{25}{100}$ of a dollar or $\frac{1}{4}$

The fifty-cent piece or half-dollar = $\frac{50}{100}$ of a dollar or $\frac{1}{2}$

There are also larger multiples of the dollar, as two dollars, five dollars and so on. These are usually issued in bill form and make it convenient to handle large sums of money.

PROCEDURE:

A. Whether you are buying lunch in school, shopping in retail stores, or receiving your weekly wages, you must be familiar with a simplified method of counting change. It is important to re-check your change when it is given to you.

Example: Count the change received from a clerk if 53¢ is spent out of one dollar. (Note: you are not to say $1.00 - 53¢ = ___?)

Answer: 53 + 2 = 55 + 2 dimes = 75 + one quarter = $1.00

Learning the following table will help to simplify counting change:

5 pennies = 1 nickel
2 nickels = 1 dime
10 dimes = 1 dollar
5 nickels = 1 quarter
2 quarters = $\frac{1}{2}$ dollar
4 quarters = 1 dollar
2 half-dollars = 1 dollar
10 dollars = 1 eagle

B. The symbol used in writing amounts of money is $, known as the dollar sign. It is placed in front of the figure or figures representing the number of dollars. The writing of amounts of money resembles the writing of decimals. The decimal point is used to separate dollars from cents and is placed directly after the number representing dollars, as $10.75.

If the amount is less than a dollar, the decimal point is placed in front of the "cents" only, and a 0 is used to express the dollar; for example, $0.45.

The sign ¢ indicates cents, and is quite often used in amounts less than one dollar. When the cent sign is used, neither the dollar sign nor the decimal point should be used. Example: 45¢.

ASSIGNMENT:

1. Examine the following amounts and write correctly those that are not properly expressed:

   a. $.72 b. $0.19¢ c. $4.50 d. $.39¢
   e. 36¢

2. $10 = how many dimes? = how many quarters?

3. $5 = how many cents? = how many nickels?

4. $3.50 = how many quarters? = how many nickels?

5. a. 10 nickels = _____ cents
   b. 31 halves = _____ cents
   c. 55 dimes = _____ cents
   d. 88 quarters = _____ cents
   e. 100 nickels = _____ cents

6. How much change should a boy get in presenting a $5 bill in payment for a pair of jeans @ $1.55 and a shirt @ $1.25? List the units of money he will receive.

7. In giving cash for a check amounting to $48.75, list the units of money you would use.

8. What is the total of the following:

3	twenty-dollar bills
6	ten-dollar bills
5	five-dollar bills
3	one-dollar bills
7	fifty-cent pieces
11	quarters
56	dimes
25	nickels
40	pennies

9. List the change received if $13.46 was spent out of $20.

10. What was the change from $10 for the following items: 2 yards of crepe @ 98¢ a yard, 1 zipper @ 40¢, 1 spool of thread @ 39¢, 1 package of seam binding @ 15¢, and 3 yards of dacron @ 69¢?

UNIT IV - RATIO AND PROPORTION

Pre-Test No. 4

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1. Mary said she could do twice as much work as Joan. How many pinafores did Joan make if Mary made 26?
2. The sophomore class made 39 blouses; the freshmen made 27 blouses. What is the ratio of the work done by the former class to that of the latter?
3. Four blouses can be made in a 7-hour day. How many working days will it take to complete 24 blouses?
4. If 5 yards of velvet cost $25. 25, find the cost of 3 yards.
5. A homemade dress costs $4. 60; a ready-made dress costs $11. 50. What is the ratio between them?
6. If the trimming for 16 dresses costs $21. 12, then $26. 40 will purchase trimming for how many dresses?
7. Find the ratio of the following quantities:
    - a. $1. 25 to $. 25
    - b. 3 yards to 2 yards
    - c. 16 gr. to 32 gr.
    - d. 8 thimbles to 16 thimbles
    - e. 46 girls to 138 girls
    - f. 4" to 2"
    - g. 6 spools to 9 spools
    - h. 9 hours to 30 min.
    - i. 5 yards to 15 yards
    - j. 16 in. to 4 yards

UNIT IV - RATIO AND PROPORTION

Relation Between Quantities **Lesson No. 1**

OBJECTIVE: To learn how to compare numbers in terms of ratio and proportion.

RELATED INFORMATION:

The mysterious word "ratio" merely means "relationship". The relationship of your weight to your height, of the length of the school day to the whole day, of the money your family pays for housing compared with the family income - all these are ratios. We are constantly using ratios in our thinking and our speaking. We might say: my house is twice as long as it is wide; my father earns four times as much as my brother; this dress uses three times the yardage of that one.

If during the summer vacation Joyce earned twice as much as Joan, that is, if for every dollar earned by Joan, Joyce earned two dollars, the ratio of their earnings would be 2 to 1.

There are occasions when the needle trades worker is given amounts and must compute their relationship to other amounts. This occurs in estimating shirring, smocking, tuckings, and pleatings.

We may express ratio in three ways. If we wish to compare the quantities 3 and 5, we could use any of these methods:

1. $3:5$ (read 3 is to 5)
2. $3 \div 5$
3. $\frac{3}{5}$ (fraction)

As a matter of custom, a ratio is generally written in fractional form. We can, therefore, do anything to a ratio, without changing its value, that we can to any other fraction. Consequently, both terms of a ratio can be either multiplied or divided by the same number without changing its value.

Complete the following statements so that a new ratio, equal to the first, will result:

$\frac{2}{3} = \frac{6}{?}$ $\frac{8}{12} = \frac{2}{?}$ $\frac{20}{25} = \frac{4}{?}$ $\frac{12}{15} = \frac{?}{5}$

A proportion is a true statement of equality of two ratios. If you completed the above exercises correctly, each is a proportion. Thus, $\frac{2}{3}$ and $\frac{6}{9}$ are equal and the statement $\frac{2}{3}$ equals $\frac{6}{9}$ (or, as it is commonly written, 2:3 :: 6:9) is a proportion. The fractional form is more convenient for computation.

There are four terms in a proportion. The first and third terms are the numerators of the fractions; the second and fourth terms are the denominators. The first and the last terms (2 and 9) are called the extremes; the second and third (3 and 6) are called the means.

PROCEDURE:

I. Ratio

The ratio of one number to another is the quotient of the first number divided by the second.

A. Example: Joan is 30 years old and her sister is 15 years old. The ratio of Joan's age to her sister's is 30 to 15 or 2 to 1.

Solution: $\frac{30 \text{ (divide by 15)}}{15 \text{ (divide by 15)}} = \frac{2}{1}$ You would read this ratio as 2 to 1.

If the scale of a drawing says "one inch to one yard", it does not mean a 1 to 1 ratio, but a ratio of 1 to 36, because both quantities must be in the same unit of measure.

B. Example: Separate 35 into two parts so that their ratio shall be 3 to 4.

Solution: The simplest way to solve this problem is as follows: Using a question mark (?) in place of the unknown numbers, let:

3 x ? = the smaller part
4 x ? = the larger part

The sum of the parts is 35; thus the equation is:

$$\begin{array}{l} 3 \times ? = \\ \underline{4 \times ? = \quad\quad} \\ 7 \times ? = 35 \end{array} \qquad \begin{array}{r} 5 \\ 7\overline{)35} \end{array}$$

$$\begin{array}{l} \text{The smaller part is } 3 \times 5 = \\ \text{The larger part is } \ 4 \times 5 = \end{array} \frac{15}{20} = \frac{3}{4}$$

II. Proportion

Whenever we have a statement that two ratios are equal, we have a proportion. Since a proportion is an equation, we can use the rules that apply to equations to solve problems involving proportions.

Example: If 8 yards of silk cost $12, how much will 13 yards cost at the same rate?

Solution:

$$\frac{8 \text{ yards}}{13 \text{ yards}} = \frac{12 \text{ dollars}}{? \text{ dollars}}$$

that is, $\frac{8}{13} = \frac{12}{?}$

Using the rule of cross-multiplication,

$$\frac{8}{13} = \frac{12}{?}$$

we get:

$$8 \times ? = 156$$
$$? = \$19.50$$

That is, 13 yards of silk cost $19.50

Rules for forming a proportion:

a. The two terms of each ratio must be like quantities, for example, in the above problem, each term of the first ratio is a number of yards; of the second, a number of dollars.

b. The two numerators and the two denominators must be corresponding quantities; that is, the value of one numerator must depend upon the value of the other numerator. Again, in the above problem, the value of the second numerator, $12, depends upon the number of yards purchased, or 8 yards, and the value of the second denominator, ? dollars, depends upon the number of yards purchased, or 13 yards.

Note: There are other ways of forming proportions, but for the purpose of minimizing errors, we will stick to these rules.

ASSIGNMENT:

1. Express the ratios of the following in the simplest form:

   a. 21" to 7"
   b. 50 bolts to 20 bolts
   c. 3 spools to 6 spools
   d. $12.75 to $102.00
   e. 2 hours to 20 minutes
   f. $1\frac{1}{2}''$ to $\frac{3}{4}''$
   g. 26 weeks to 1 year
   h. 3 yards to 2 feet
   i. 2 dimes to 1 dollar
   j. 6 months to 9 days
   k. 32 cones to 8 cones
   l. 120 yards to 15 yards

2. Virginia spends 6 hours in shop every day and Mary spends 4 hours. What is the ratio of the time Virginia spends to the time Mary spends? For every three hours Virginia spends, how many hours does Mary spend?

3. Operator A made 14 dozen blouses in one week. Operator B made $3\frac{1}{4}$ dozen. What is the ratio of the number of blouses made by A to the number made by B?

4. Write the following ratios as fractions (reduce in each case to the lowest terms)

   a. 9:12
   b. 36:3
   c. 18:15
   d. 45:55
   e. 16:48
   f. 24:26

5. If a length of percale is 48" long and 36" wide, find the ratio of the length to the width. Of the width to the length.

6. Find the ratio of 25 to (a) 30 (b) 50 (c) 60.

7. What is the ratio of 15 minutes to (a) 1 hour, (b) half-hour, (c) 45 minutes?

8. What is the ratio of 15¢ to 75¢?

9. Three numbers have the ratio 3:4:5. Find the numbers if their sum is 96.

10. If 10 girls operating power sewing machines can produce 140 dresses in 14 hours, how many dresses can 15 girls produce in the same amount of time?

11. On an annual income of $3600, $700 is set aside for rent. At the same rate, how much should be set aside from an income of $4000?

12. Twenty-four circular sections can be cut from $1\frac{1}{2}$ yards of 36" organdy. How many sections can be cut from $2\frac{1}{4}$ yards?

UNIT IV - RATIO AND PROPORTION

Estimates and Approximations **Lesson No. 2**

OBJECTIVE: To learn to estimate answers to problems.

RELATED INFORMATION:

In many cases it will be helpful to make a rough estimate of the answer to a problem before solving for the exact result. Errors are often made in placing the decimal point, thus giving results that are ridiculous.

Example: Find the cost of $3\frac{3}{4}$ yards of cloth at $1.10

Solution: First estimate the cost by rounding $3\frac{3}{4}$ yds. to the nearest whole number, 4 yards, which at $1.10 gives you an estimate of $4.40. Then by actual calculation you find the result is $4.125.

$$\begin{array}{r l} 3.75 & \text{yds.} \\ \underline{\$1.10} & \\ 3750 & \\ \underline{375} & \\ \$4.1250 & \end{array} \qquad \text{OR} \qquad \begin{array}{r l} \$1.10 & \\ \underline{3.75} & \text{yds.} \\ 550 & \\ 770 & \\ \underline{330} & \\ \$4.1250 & \end{array}$$

By estimating in advance, such results as $41.25 or $0.41 are recognized to be wrong.

ASSIGNMENT:

In each of the following problems, first estimate the result, then solve for the exact result.

1. Find the cost of 22 yards of material at $1.10 a yard.
2. A man worked 42 hours in a week. His hourly wage was $1.77 an hour. How much did he earn?
3. Find the cost of $17\frac{1}{4}$ yards of percale at $23\frac{1}{4}$¢ a yard.
4. At $4\frac{1}{4}$ yards of material per dress, how many can be made from a bolt of $75\frac{3}{4}$ yds.?
5. At $10.75 per dress, how many can be bought for $130.00?

6. If each dress needs 8 buttons, how many dresses will a stock of $1\frac{1}{2}$ gross buttons trim?

7. $2\frac{1}{2} \times 3\frac{1}{2}$

8. $4\frac{1}{4} \times 3\frac{3}{4}$

9. $23 \times 3\frac{3}{4}$

10. $31 \times 4\frac{1}{2}$

11. $\$2.00 \div 16\frac{1}{2}$

12. $28\frac{1}{2} \div 7\frac{1}{2}$

UNIT IV - RATIO AND PROPORTION

Estimating Amounts for Tucking and Hems — Lesson No. 3

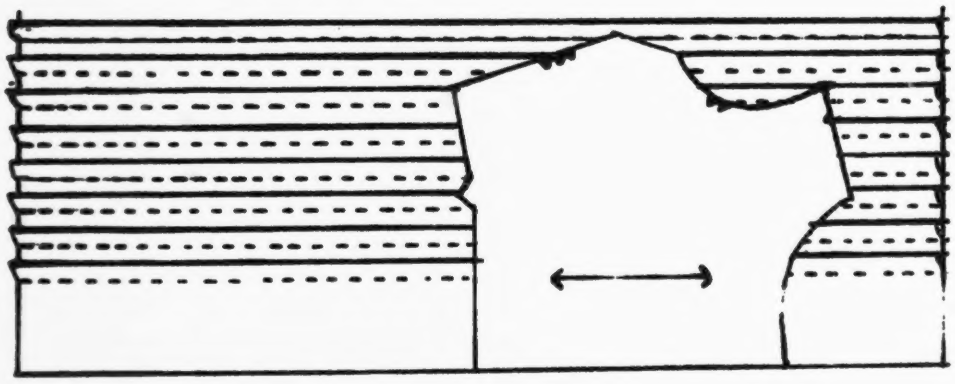
OBJECTIVE: To learn the basic rule for estimating amounts for tucking and hemming.

RELATED INFORMATION:

A tuck is a fold in the cloth for the purpose of trimming or decoration. A tuck takes up twice its own depth, that is, a one-inch tuck takes up two inches of fabric.

In the garment industry there are special firms that handle tucking, shirrings, and pleatings to be used in the making of garments. When figuring tucking it is important to know the width of the material to be tucked, the size of the tuck, and the finished size needed to cut the pattern needed for the dress.

This is the procedure that is followed: after a sample has been made in the sample room and the garment is ready to be put into production, the estimated yardage is sent out to be tucked. When the tucking is completed and returned to the manufacturer, the pattern is placed on the tucking and cut.

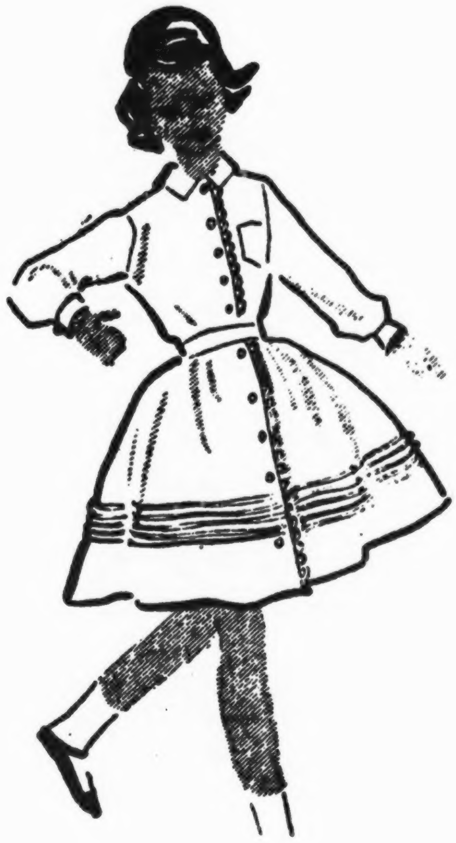


A hem on a piece of cloth is an edge turned over to form a border or finish. In making a hem, the edge must always be turned or taped to prevent fraying, except for heavy or loosely woven cloth. The amount turned under is usually $\frac{1}{4}$" or, for narrower hems, $\frac{1}{8}$" is allowed. For example, for a one-inch hem, plus $\frac{1}{4}$" for turning, you would have to allow $1\frac{1}{4}$" of cloth.

PROCEDURE:

You must remember that, no matter what size tuck is used, the same rule applies: "Twice the width of the tuck from stitch to fold is the amount of material used for one tuck."

Example A:



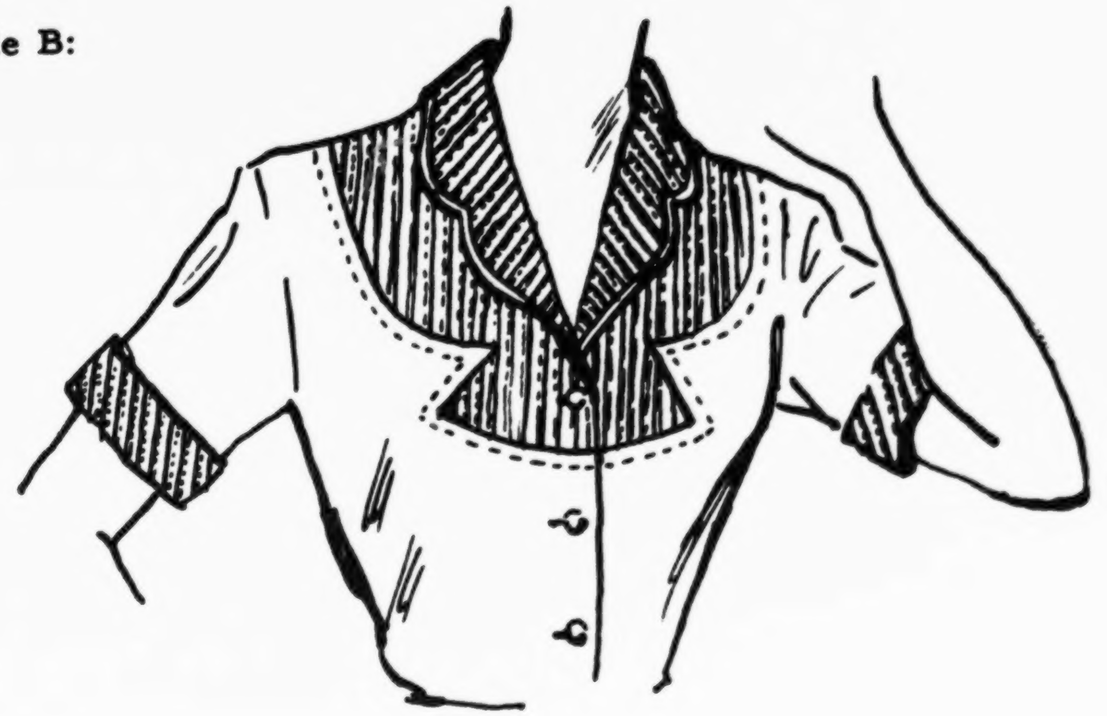
This child's dress was completed in the sample room and is now ready to put into production.

In checking the skirt, you find the finished length of the skirt is 20", there are four $\frac{1}{2}$" tucks, and a 2" hem with $\frac{1}{4}$" allowed for turning.

What is the width of the material to be sent out for tucking?

Solution:	20"	finished length of skirt
	4"	taken up by tucks (4 tucks @ 2 x $\frac{1}{2}$")
	$2\frac{1}{4}$"	width of hem and turning
	$26\frac{1}{4}$"	width of material needed to be sent out for tucking

Example B:



The above sample blouse has a tucked yoke. In the manufacture of garments with tucking used in this manner, the width of the fabric is completely tucked. All the stitching of tucks is done on the length. This is known as "all-over tucking".

Broadcloth 36" wide was used for this tucking. Thirty-six tucks, each $\frac{3''}{16}$ wide, were made across the width of the fabric.

What is the width of the fabric after tucking? If each yoke requires 11" of tucked fabric, how many yokes can be cut out of the width?

Solution:

36" width of the broadcloth before tucking
- $\underline{13\frac{1}{2}''}$ taken up by the tucks ($\frac{3''}{16} \times 2 = \frac{6}{16} = \frac{3''}{8}$ $\frac{3''}{8} \times 36$ tucks)
$22\frac{1}{2}''$ width of broadcloth after tucking

$11/\underline{22}$
2 yokes can be cut out of the width.

PRACTICE:

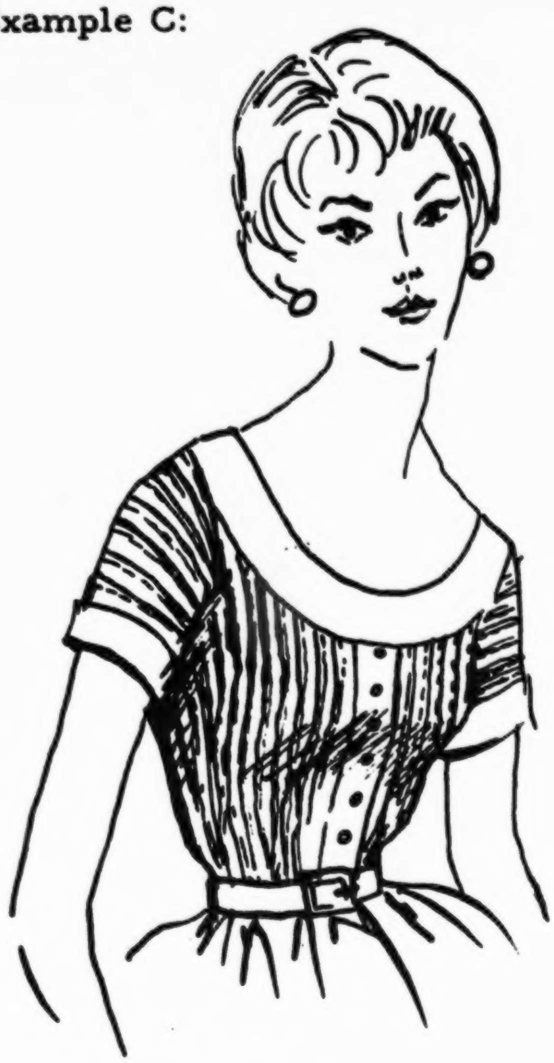
1. Make a gauge to be used in making $\frac{1}{4}''$ tucks with $\frac{1}{4}''$ space.

2. Using a $\frac{1}{4}''$ gauge, make a $\frac{1}{4}''$ tuck in a piece of paper. How much material is taken up by the tuck?

3. Using your gauge, turn a one-inch hem on a paper and see that it is perfectly straight. How much material is taken up by the hem?

4. Take a piece of paper 6" wide and,using your gauge, make a half-inch hem with $\frac{1}{8}$" allowance for turning and three $\frac{1}{4}$" tucks, with $\frac{1}{4}$" space between tucks. How much material is taken up by the hem and tucks?

Example C:



In checking this sample, we find the designer used fabric tucked with $\frac{1}{4}$" tucks with a $\frac{1}{4}$" space between tucks.

How many tucks were made in this fabric, which was 42" wide?

What was the finished width of the material?

Solution:

$\frac{1}{2}$" or $\frac{2}{4}$" = material taken up by tuck ($\frac{1}{4}$" x 2)
$\frac{1}{4}$" = space between
$\frac{3}{4}$"

42" (width of the material) ÷ $\frac{3}{4}$"

$$\frac{42}{1} \div \frac{3}{4} = \frac{\overset{14}{\cancel{42}}}{1} \times \frac{4}{\underset{1}{\cancel{3}}} = 56 \text{ tucks}$$

42" = width of material before tucking
- 28" = material taken up by the 56 tucks x $\frac{1}{2}$"
14" = width of material after tucking

ASSIGNMENT:

1. How many tucks, each $\frac{1}{4}''$ wide, can be made from a piece of material one yard wide, if the tucks are $\frac{1}{4}''$ apart?

2. How many $\frac{1}{8}''$ tucks, $\frac{1}{4}''$ apart, can be made from a piece of material twenty-four inches wide?

3. A piece of cloth contains eight $\frac{1}{2}''$ tucks, $\frac{1}{4}''$ apart. If the tucks start 4" from each edge of the cloth, how wide is it? How wide would it be if the tucks were ripped out?

4. A piece of cloth originally $29\frac{1}{4}$ inches wide contains how many $\frac{1}{4}''$ tucks, $\frac{1}{4}''$ apart, if the first and last tucks are $\frac{1}{4}''$ from the edge of the cloth? How wide will the finished piece be?

5. If three 2" tucks, $\frac{1}{2}''$ apart are to be put around a skirt which is to be 28" long when finished, how long must the skirt be cut to allow for the tucks and a $3\frac{3}{4}''$ hem with a $\frac{1}{4}''$ allowance for turning?

6. Material is sent to a commercial tucker. How wide will this 24" material be after tucking with $\frac{1}{16}''$ tucks set $\frac{1}{8}''$ apart?

7. How many $\frac{1}{32}''$ tucks, $\frac{1}{16}''$ apart can be made from a piece of muslin 24" wide?

8. How many $\frac{1}{8}''$ tucks, $\frac{1}{8}''$ apart can be made from a piece of lawn 30" wide?

9. If a piece of cloth contains thirty 1" tucks and is 30" long, how long would it be if the tucks were ripped out?

10. Give the amounts of material allowed for one tuck in the following sizes:

a. $\frac{1}{16}''$ ________
b. $\frac{1}{8}''$ ________
c. 1" ________
d. $\frac{3}{8}''$ ________
e. $\frac{1}{4}''$ ________
f. $\frac{1}{2}''$ ________
g. $1\frac{1}{2}''$ ________
h. $\frac{3}{4}''$ ________

Estimating Fullness for Ruffling and Shirring — Lesson No. 4

OBJECTIVE: To learn the basic rules for estimating ruffling and shirring.

RELATED INFORMATION:

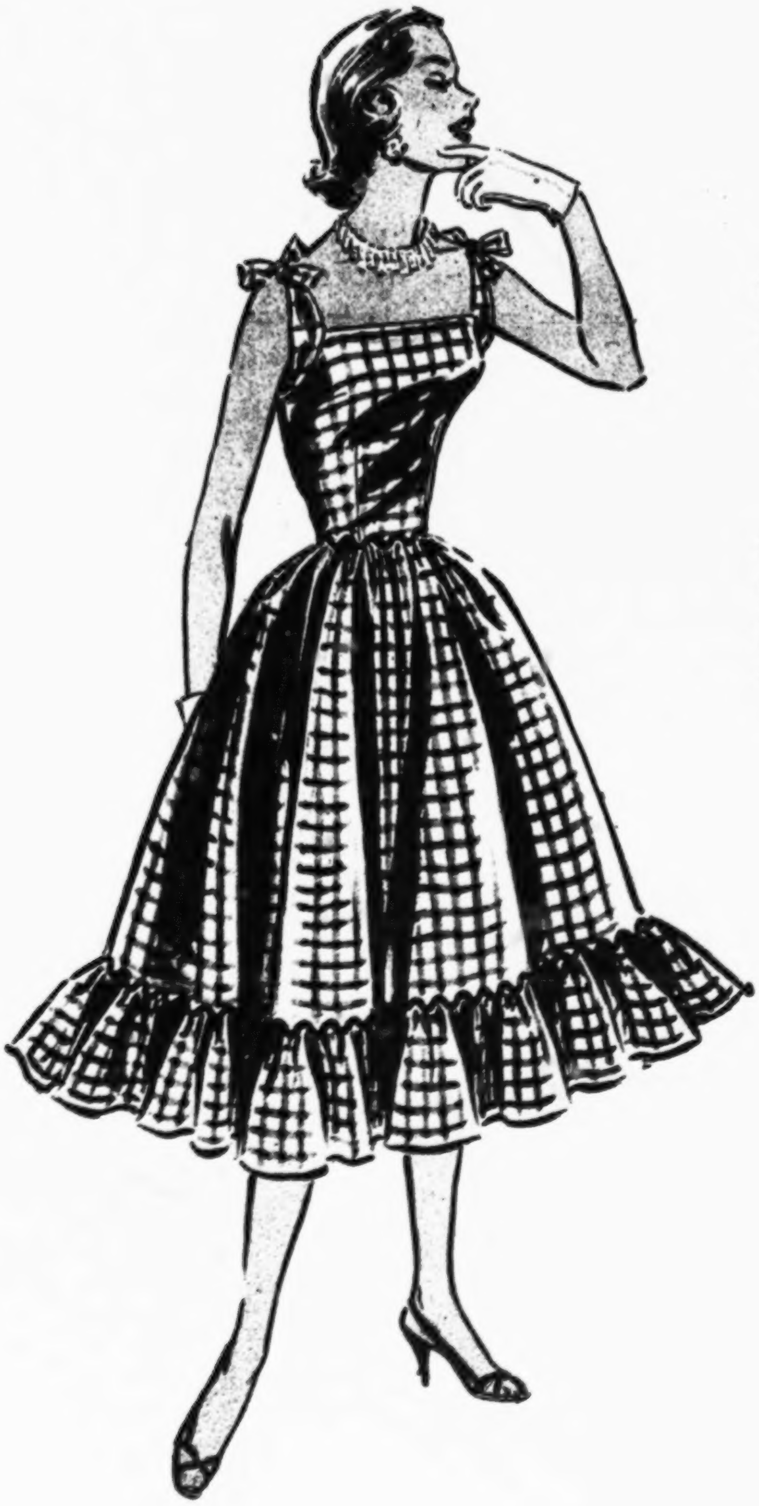
A ruffle is a strip of cloth gathered in narrow folds on one edge and used for trimming. When making ruffles, allowance must be made for fullness. In determining allowances, one and one-half times the distance is usually allowed for ordinary ruffles; but where less fullness is desired $1\frac{1}{3}$ or even $1\frac{1}{4}$ times is allowed. The amount of fullness required for ruffling depends on the garment and the type of fabric used. A heavier fabric will not need as much gathering as a sheer fabric. Different proportions of material are allowed according to the use to which it is to be put. A ruffle cut along the width is generally moresatisfactory, but they are often cut along the length of the cloth.

Double rows of ruffles are very effective in some cases and sometimes when ruffles are very narrow, three or five rows are used.

PROCEDURE:

In estimating how much material is required for ruffles or shirring, the fullness desired is the determining factor.

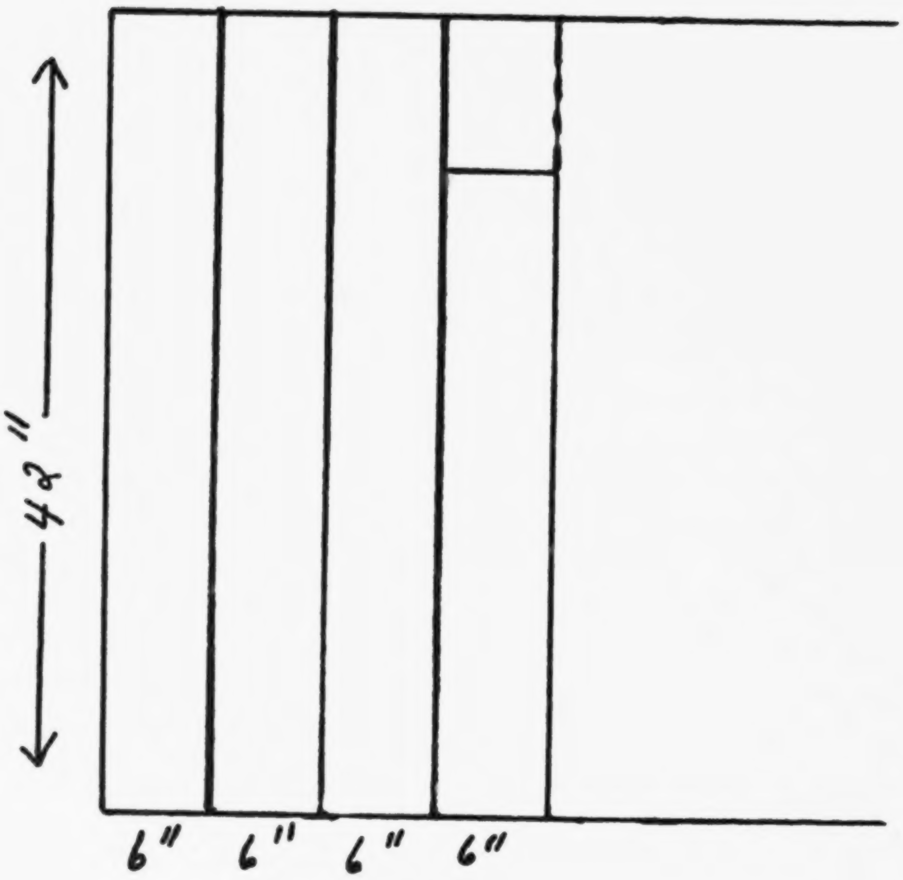
Example A:



This skirt has a 6" ruffle sewed to the bottom of the skirt. The skirt measures 3 yards wide and the fabric used is 42" dacron/cotton.

How much material is required for the ruffle if the allowance is 1½ times the width of the skirt for fullness? (The ruffle is to be cut along the width of the fabric.)

Solution:



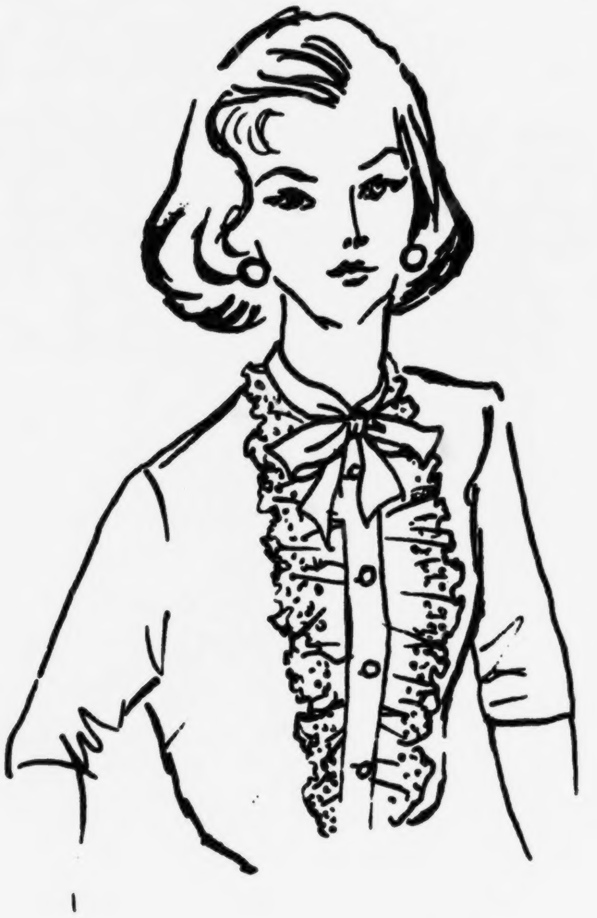
3 yds. (width of the skirt) x $1\frac{1}{2}$ (allowance for fullness) = $4\frac{1}{2}$ yds. (length of ruffle needed)

$4\frac{1}{2}$ yds. ÷ $1\frac{1}{6}$ yds. (material is 42" wide) = $3\frac{6}{7}$ strips of material needed for ruffle.

4 strips ($3\frac{6}{7}$ = 4 Any fraction of a width must be counted as a whole width)

4
x 6" width of ruffle
24" of material needed for the ruffle (or $\frac{2}{3}$ yard).

Example B:



This blouse has a shirred batiste ruffle in the front. Two yards of embroidered batiste for each blouse was sent out to be shirred. The front space to which this trimming was to be sewn measured 14".

What was the ratio or allowance for shirring?

Solution:

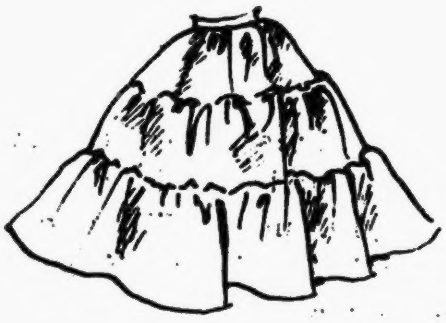
2 sides to the front of the blouse ÷ 2 yds. of embroidered batiste = 1 yard used for each side of blouse front.

36 ÷ 14" (finished length) $\begin{array}{r} 2\frac{1}{2} \\ 14\overline{)36} \end{array}$

$2\frac{1}{2} : 1$ = the ratio

$2\frac{1}{2}$ times the length is the allowance for shirring

Example C:



In computing the material needed to make this 3-tier gathered skirt, the width at the bottom of each tier is the determining factor.

The top tier measures 7" long and 2 yards wide. The second tier measures 9" long and the allowance for fullness is 2 times the width of the top tier. The third tier measures 12" long and is 2 times the width of the second tier.

How much fabric is needed to make this 3-tier gathered skirt, if 36" fabric is used?

Note: All seams and the hem allowances are included in these figures.

Solution:

The yardage needed for each tier must be computed individually.

Top tier: 2 yards of 7" width are needed for the top tier. Since the material is 1 yard wide, two yards will require 2 strips each 7" wide.
2 x 7" = 14" of material for the top tier.

Second tier: 2 x 2 yds. = 4 yards of ruffling needed. In this case, 4 yards means 4 strips, each 9" wide.
4 x 9" = 36" or 1 yd. of material needed for second tier.

Bottom tier: 2 x 4 yds. = 8 yards of ruffling needed (width of second tier with fullness allowed).
8 x 12" = 96" or $2\frac{2}{3}$ yards of material needed for bottom tier.

Total material needed:

Top tier	14"
Second tier	36"
Bottom tier	96"
	146" or 4 yards and 2 inches needed.

You would have to purchase $4\frac{1}{8}$ yards.

ASSIGNMENT:

1. A nylon net petticoat measures 3 yards around the bottom. We have decided to add a ruffle 9" deep and to figure the fullness at $2\frac{1}{2}$ times. Nylon net is 72" wide. How much net is needed for the ruffle? (Hint: if the number of strips is fractional, use the next highest whole number).

2. How many pieces of percale 36" wide are needed for 3 yards of ruffling?

3. How many yards of ruffling are needed for 14 aprons if each apron is one yard wide, and half the width of the apron is added for fullness?

4. If gathering stitches are made approximately $\frac{1}{16}$" long, how many stitches are there in an inch?

5. How much material would you need for a gathered skirt, if the waist measurement is 26" and the length is 27" including all seams and hem, and the allowance for fullness is 4:1? The material used is 36" wide.

6. In making a gathered skirt, $3\frac{3}{4}$ yards of 36" material was used. The waist measurement was 24", the length was 27" including all seams and hem. What was the fullness allowed?

7. In finishing a slip, it was decided to add an 8" ruffle. The bottom of the slip was 44" wide; the allowance for shirring was $1\frac{1}{2}$ times. How many strips of 44" material would be needed for 1 slip? How many yards for 150 slips?

8. If the side and bottom edges of one pair of net curtains measures 4 yards each, how much additional material will be needed to cut a 5" ruffle including seams and hem for the side and bottom edge? The net is 50" wide and the ratio is 2:1.

9. How much additional 42" rayon taffeta will be necessary to make an 8" shirred ruffle including seams and hem, around the bottom of two gross slips, if the lower edge of one measures 41" and the ratio is 2 to 1?

10. What width of cloth is needed for making a ruffle $3\frac{7}{8}$" deep allowing $\frac{7}{8}$" for a heading and $1\frac{1}{4}$" for hem and $\frac{1}{4}$" for first turn of hem? Find the amount of material required to make 3 yards of ruffling if made of material 36" wide.

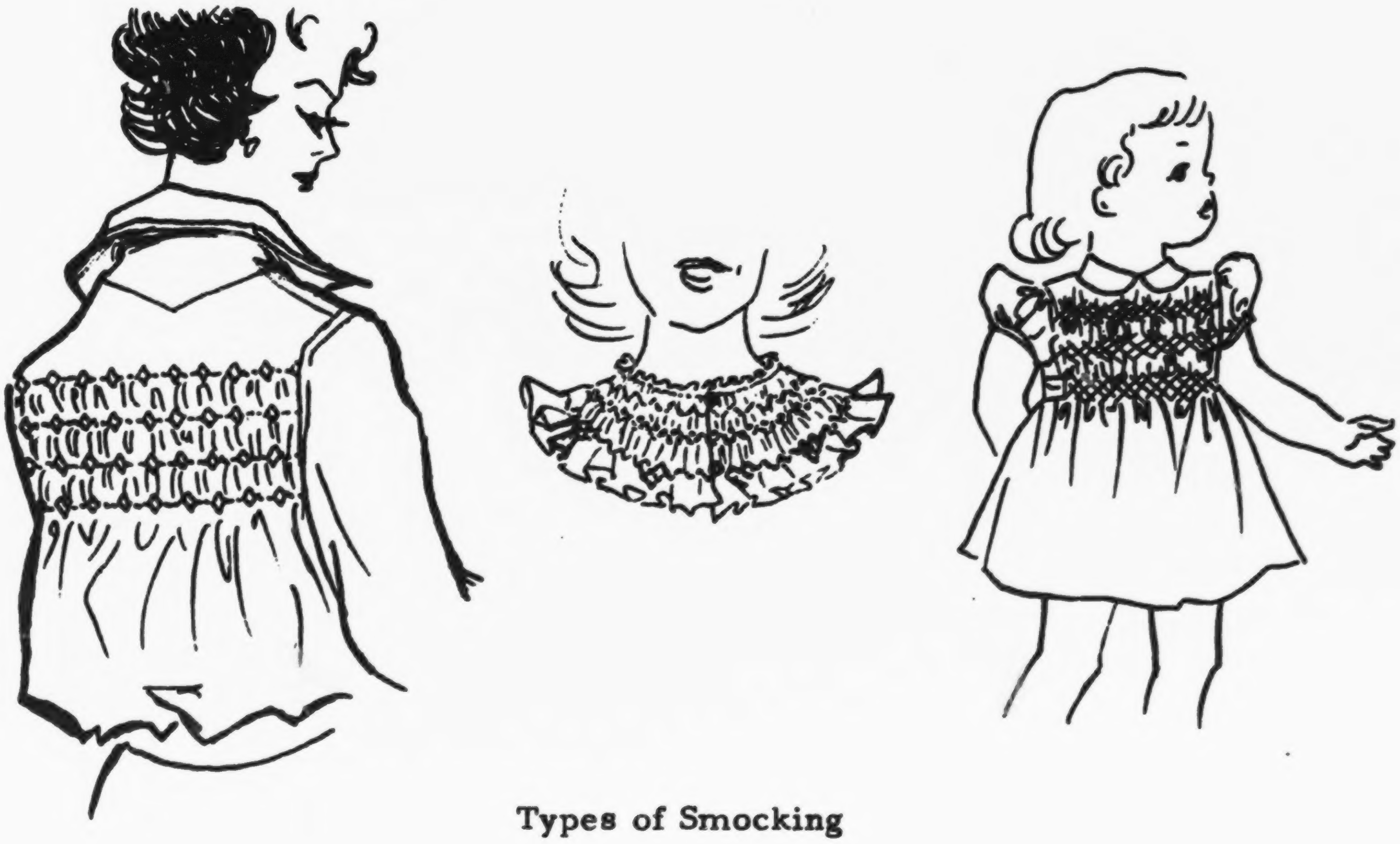
UNIT IV - RATIO AND PROPORTION

Estimating Fullness for Smocking **Lesson No. 5**

OBJECTIVE: To learn the method used in figuring material used in smocking.

RELATED INFORMATION:

Smocking is the gathering in lines at regular intervals so as to produce a shirred effect (see below). The type of garment being made determines the style of smocking used. You will find smocking used mostly in children's wear. It has traditionally been done by hand, but recently machine smocking has come into use.



Types of Smocking

PROCEDURE:

The general rule for smocking is to allow three times the width of the finished design (ratio 3:1). The fullness desired determines the width of fabric needed.

Example: In a 2" finished design, 6" of material was used. This particular smocking used 3 times the finished design.

$\begin{array}{r} 3 \\ 2\overline{)6} \end{array}$ Ratio 2:6 = 1:3

ASSIGNMENT:

1. The smocking at the head of a sleeve measured 3" when finished. If the material measured $7\frac{1}{2}$" before smocking, what was the additional fabric allowed for the smocking? What was the ratio?
2. How much material is required for a smocking design measuring $2\frac{1}{2}$" finished at $3\frac{1}{2}$ times the width?
3. A skirt measuring 22" around the waist is being trimmed with smocking around the top. How much material is needed at 3 times the width of design?
4. A smocking design measuring $5\frac{3}{4}$" when finished requires $3\frac{1}{4}$ times the width of the design. Find the width of material needed.
5. Find the material needed for the following smocking designs:

	Width	Ratio
a.	16"	$1\frac{3}{4}$
b.	$5\frac{1}{2}$"	$2\frac{1}{4}$
c.	$2\frac{1}{2}$"	2
d.	$4\frac{1}{4}$"	3
e.	24"	4

Estimating Allowance for Pleating

Lesson No. 6

OBJECTIVE: To learn the basic rules in figuring material needs in the making of pleats.

RELATED INFORMATION:

Perhaps you are fond of wearing the ever-popular pleated skirt. This is a style that remains in fashion always; in children's wear, through teen-age, to women's wear. Pleats used this way not only add fullness but also give line interest to clothing.

Pleats can be prepared by the dressmaker or, as in the garment industry, sent out to a shop that will do steam pleating, - sometimes called machine pleating. Steam pleating usually proves an economy in time and also stays in very well.

A pleat is a fold in the fabric that releases fullness. As you look around in your class, you may observe a number of different kinds or arrangements of pleats. They will probably fall into one of the following groups. The first group covers straight pleats pressed into the desired type such as: box pleats, inverted pleats, kick or side pleats, and unpressed pleats. Novelty pleating done by the machine pleaters, the second group, includes accordion, crystal, fine knife pleating, and variations and combinations of box pleats.

PROCEDURE:

When the edges of pleats touch, how much material must you allow for the pleats? A one-inch pleat requires three inches of material, or a fitted all-around pleated skirt with pleats touching requires three times the hip measurement.

1. From material or paper, make a one-inch pleat with a one-inch underlay. Mark where your pleat ends.

2. Open the pleat and measure the surface needed to make a single pleat.

3. You will find that the underlay measures two inches.

4. The complete surface or material needed would be two inches for underlay plus one inch for the width of the pleat.

5. To make a single pleat, the material must be cut three times the width of the pleat, if the underlay is the same width as the pleat.

The important facts in the construction of a pleat are:

A. The depth of the pleat or the underlay, which is the amount of material from outside fold of pleat to the inside fold of the pleat. (The actual measurement of the material needed to form underlay will be twice the depth.)

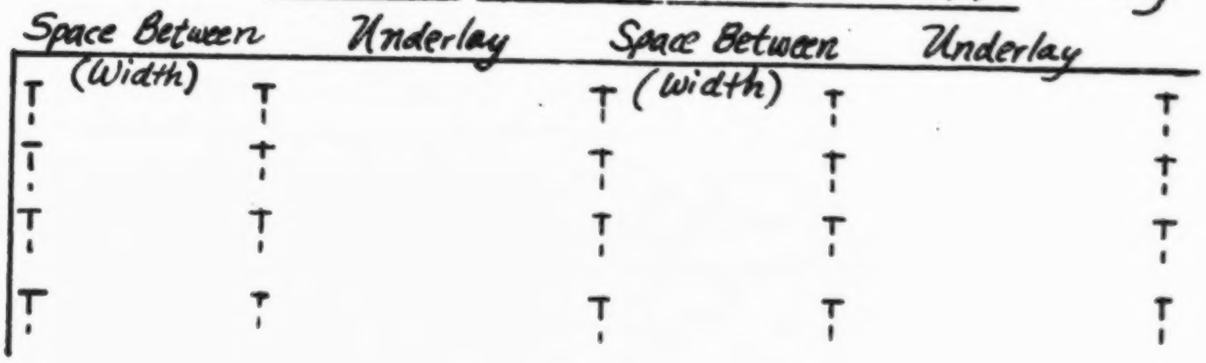
B. The width of the pleat or the space between pleats. It is the amount of each pleat that shows between folds on top of skirt.

C. The type of pleating to be made.

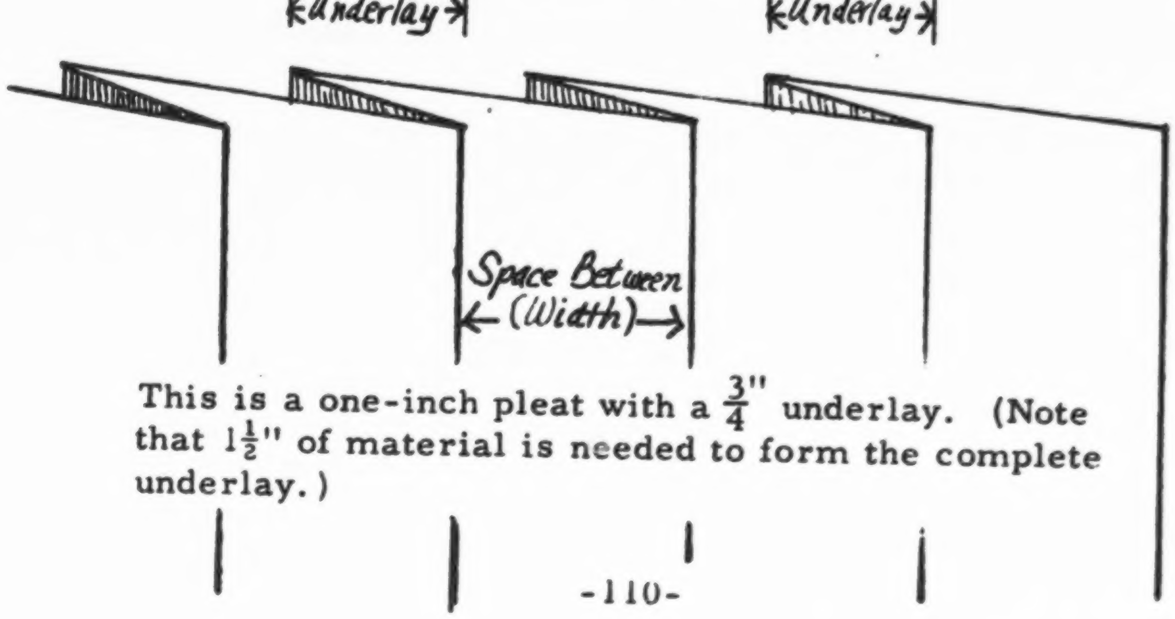
> A box pleat requires twice as much as a single pleat and a double box pleat twice as much as a box pleat.

The following diagrams show the formation of a single pleat:

Fabric Prepared for One Inch Side Pleats with 3/4" Underlay


Space Between (Width)
Underlay
Space Between (Width)
Underlay

Finished Pleating


Underlay
Underlay
Space Between (Width)

This is a one-inch pleat with a $\frac{3}{4}$" underlay. (Note that $1\frac{1}{2}$" of material is needed to form the complete underlay.)

Example: In making an unpressed pleated skirt with a one-inch space between each pleat and an underlay of one inch, the total material needed for one pleat would be three inches. In making an unpressed pleated skirt, the other measurements needed are the waist and the length. If the waist is 24" and the length 27" including hem, how many yards of 36" material would we need?

Solution:
24" (waist measurement) x 3" (needed for each pleat)
72" of material ÷ 36" material = 2 lengths needed
27" length of skirt x 2 = 54" or $1\frac{1}{2}$ yards.

ASSIGNMENT:

1. Estimate the amounts required for these pleats:
   - a. one 2" box pleat
   - b. four 3" side pleats
   - c. two 1" side pleats
   - d. one 2" side pleat
   - e. one 4" inverted pleat
   - f. a 12" cut will make how many 2" side pleats?
2. How many yards of 54" woolen material will be needed for a skirt with a one-inch pleat and a 2" underlay, measuring 36" at the hip? The length of the skirt is 27" long including hem.
3. How many box pleats 2" wide with a full-size underlay can be made out of material 72" wide?
4. If it takes 81 inches to make 9 box pleats, how many inches will it take to make 7 box pleats of the same size?
5. How much material is required to make ten single pleats 2" wide with a 1-inch underlay? How many box pleats of the same width can be made out of the same piece of material?
6. How many single pleats, one inch wide with a 1-inch underlay can be made from a piece of material 24 inches wide? 42" wide? 14" wide?
7. The front of a child's dress was cut 28" wide, but when pleated it measured just 16". How many one-inch pleats with a 1-inch underlay were made in the dress front?
8. If it takes 72" to make 16 single box pleats, how many double box pleats could be made out of the same piece of material?

9. How many one-inch box pleats with a 1-inch underlay can be put into 42"?

10. How much material will be needed to make a pleated ruffle, $\frac{1}{2}$" wide with a $\frac{1}{4}$" underlay, for a taffeta slip which measures 48" around the lower edge? The ruffle is to be 4" deep with a $\frac{1}{8}$" hem. The material is 42" wide.

11. How many yards of finished pleating would you need on three tiers of this dress: the first tier measures 42", the second 50", and the third 60". For 135 dresses?

UNIT V - DECIMALS

Pre-Test No. 5

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1. **Add the following:**

   a. 24.75, 33.29, 8.35, 25.64
   b. 45.643, 8.295, 4.64, 35.63
   c. 25.64, 63.25, 29.74, 35.25
   d. 24.00, 32.24, 9.50, 10.00, 4.75

2. **Subtract the following:**

   a. 24.65 - 13.82
   b. 24.8 - 8.63
   c. 105.00 - 75.25
   d. 28.35 - 12.16
   e. 35.25 - 16.98
   f. 57.00 - 7.62

3. **Tell how many decimal places there will be in each of these products.**

   a. 2.5 x 3.4
   b. 23.5 x 22.4
   c. 1.67 x 2.34
   d. 60.8 x 3.47
   e. 1.25 x 2.25
   f. 2.64 x 43.7

4. **Multiply the following:**

   a. 25 yards of lace @ 6$\frac{1}{2}$¢
   b. 66 yards of dotted swiss @ $0.6975
   c. 27 buttons @ $0.027
   d. 16 spools of thread @ $0.057
   e. 112 yards of organdy @ $0.605

5. **Deduct the cost of the trimmings from the cost of materials used in the following garments:**

	Material	Trimmings
a.	$9.43	$1.58
b.	6.75	1.86
c.	4.75	$\frac{3}{10}$ of a dollar
d.	7.46	$\frac{7}{10}$ of a dollar
e.	3.33	$\frac{1}{2}$ dollar

6. The price of $\frac{1}{4}$" elastic is quoted @ \$0.035 per yard. The price is increased to \$0.0433. How much more will it cost per yard than the original quotation? Compute the additional cost of 435 yards.

7. A discount of \$3.56 is allowed from a bill of \$32.25. What is the amount of the bill after deducting the discount?

8. Find the total cost of making a dress, if you purchased $3\frac{5}{8}$ yards of dacron/cotton @ 69¢, zipper @ 45¢, 4 buttons @ $12\frac{1}{2}$¢ each, 2 spools of thread @ 10¢ a spool.

9. From a 54" length of serge, a 24" piece was sold. Find the cost of the remainder at \$1.75 per yard.

10. If a man owes \$325 and pays 25% of it, how much does he pay? How much remains to be paid?

UNIT V - DECIMALS

Review Lesson No. 1

OBJECTIVES: To develop an understanding of the relation of decimals to fractions.
To learn the proper way to read and write decimals in word form and to develop a concept of their size or value.

RELATED INFORMATION:

The following ad appeared in a newspaper: "Collars reduced from \$0.98 to \$0.50". If you can read \$0.98 or \$0.50 without using the word "cents", then you recognize \$0.98 and \$0.50 as decimal parts of a dollar. This is the most common use of decimals.

Decimals are a special way of writing fractions whose denominators are 10, 100, 1000, or any multiple of ten. Since decimals are only fractions in a different form, you must keep in mind that decimals are only parts of a unit. In reading decimals, the number to the right of the decimal point is the top number (numerator) of the fraction, while the bottom number (denominator) is determined by the number of places to the right of the decimal point. The digits to the right of the decimal point are known as certain decimal places.

PROCEDURE:

The following is a table that will help to recall the reading of decimals:

.6	One decimal place:	tenths	$(\frac{6}{10})$
.06	Two decimal places:	hundredths	$(\frac{6}{100})$
.006	Three decimal places:	thousandths	$(\frac{6}{1000})$
.0006	Four decimal places:	ten thousandths	$(\frac{6}{10000})$

Example A: $.98 = \frac{98}{100}$

There are two places to the right of the decimal point; therefore, the decimal place is hundredths.

Example B: A number like .125 means $\frac{1}{10} + \frac{2}{100} + \frac{5}{1000}$

But $\frac{1}{10} = \frac{100}{1000}$ and $\frac{2}{100} = \frac{20}{1000}$

Therefore $.125 = \frac{100}{1000} + \frac{20}{1000} + \frac{5}{1000}$ or $\frac{125}{1000}$

The easy way to read a decimal is to read the number after the decimal point and then give it the name of its last decimal place, as, in the above example, one hundred twenty-five thousandths.

A number like 12.125 is read as twelve and one hundred twenty-five thousandths. The word and is read only when you come to the decimal point.

The value of the decimal changes according to the position of the decimal point. Moving the decimal point one place to the left divides the value of the number by 10, while moving it one place to the right multiplies the value of the number by 10. This important relation is illustrated in the following arrangement of the number 3.055:

3.055	
30.55	This is 10 times the value of the number above it.
305.5	This is 10 times the value of the number above it.
3055.	This is 10 times the value of the number above it.

ASSIGNMENT:

Exercise I. Write the following numbers in words:

1. 9.46
2. .346
3. 24.06
4. .0156
5. 34.7
6. 16.005
7. 19.48
8. .34
9. 178.8953
10. 54,325.789

Exercise II. Read each number and then write it as a common fraction or as a mixed number.

1. 3.5
2. 9.98
3. .785
4. 8.37
5. .65
6. .8
7. 4.333
8. 550.064

Exercise III. Write these numbers as decimals:

1. $\frac{16}{100}$
2. $\frac{248}{1000}$
3. $\frac{55}{100}$
4. $2\frac{9}{10}$
5. $16\frac{315}{1000}$
6. $\frac{702}{1000}$
7. $28\frac{6}{10}$
8. $2\frac{56}{100}$
9. $14\frac{1}{10}$
10. $\frac{630}{1000}$

Exercise IV. Write the following words in decimals:

1. Three hundred twenty-eight thousandths
2. Three thousand and five ten-thousandths
3. Eighty-six hundredths
4. Eighteen and two hundred ninety thousandths
5. Four hundred twenty-eight and four hundredths
6. Two and seven hundredths
7. Fifteen and eighty-four thousandths

Exercise V. Which of the following numbers have the same value?

1. .6 60 .60 .06 .600 600

2. 78 .78 7.80 780 .780 .0780

Exercise VII.

From a magazine or newspaper cut out or copy and bring to class five sentences or articles that contain decimals.

B. Changing decimals to fractions

1. Use the figure in the decimal as the numerator.
2. The figure for the denominator is 1 (one) followed by as many zeros as there are figures to the right of the decimal point.

Example:	.7 equals $\frac{7}{10}$	The 7 is placed over 1 plus one zero because we have but one number after the decimal point.
	$.75 = \frac{75}{100}$	Here we have two numbers after the decimal point, hence 2 zeros.

C. Sometimes you will need to change a decimal or "disguised fraction" back to its fractional form. Follow this method:

Change .375 to 16ths

$$.375 = \frac{?}{16}$$

Multiply the decimal by the denominator of the fraction you want: 16 in this case. (Note that 3 decimal places must be marked off in the answer.)

$$\begin{array}{r} .375 \\ 16 \\ \hline 2250 \\ 375 \\ \hline 6.000 \end{array} = \frac{6}{16} = \frac{3}{8} \quad \text{(ans.)}$$

Check this by changing $\frac{3}{8}$ to a decimal, as shown in A above.

D. **Below is a sample of a decimal equivalents chart, a handy reference in the trade.**

EQUIVALENT FRACTIONS AND DECIMALS

Fractions				Decimals	Fractions				Decimals
1/64	..	..	..	0.015 625	33/64	..	..	..	0.515 625
..	1/32	..	..	0.031 250	..	17/32	..	..	0.531 250
3/64	..	..	..	0.046 875	35/64	..	..	..	0.546 875
..	..	1/16	..	0.062 500	..	..	9/16	..	0.562 500
5/64	..	..	..	0.078 125	37/64	..	..	..	0.578 125
..	3/32	..	..	0.093 750	..	19/32	..	..	0.593 750
7/64	..	..	..	0.109 375	39/64	..	..	..	0.609 375
..	..	..	1/8	0.125	..	..	..	5/8	0.625
9/64	..	..	..	0.140 625	41/64	..	..	..	0.640 625
..	5/32	..	..	0.156 250	..	21/32	..	..	0.656 250
11/64	..	..	..	0.171 875	43/64	..	..	..	0.671 875
..	..	3/16	..	0.187 500	..	..	11/16	..	0.687 500
13/64	..	..	..	0.203 125	45/64	..	..	..	0.703 125
..	7/32	..	..	0.218 750	..	23/32	..	..	0.718 750
15/64	..	..	..	0.234 375	47/64	..	..	..	0.734 375
..	..	..	1/4	0.25	..	..	..	3/4	0.75
17/64	..	..	..	0.265 625	49/64	..	..	..	0.765 625
..	9/32	..	..	0.281 250	..	25/32	..	..	0.781 250
19/64	..	..	..	0.296 875	51/64	..	..	..	0.796 875
..	..	5/16	..	0.312 500	..	..	13/16	..	0.812 500
21/64	..	..	..	0.328 125	53/64	..	..	..	0.828 125
..	11/32	..	..	0.343 750	..	27/32	..	..	0.843 750
23/64	..	..	..	0.359 375	55/64	..	..	..	0.859 375
..	..	..	3/8	0.375	..	..	..	7/8	0.875
25/64	..	..	..	0.390 625	57/64	..	..	..	0.890 625
..	13/32	..	..	0.406 250	..	29/32	..	..	0.906 250
27/64	..	..	..	0.421 875	59/64	..	..	..	0.921 875
..	..	7/16	..	0.437 500	..	..	15/16	..	0.937 500
29/64	..	..	..	0.453 125	61/64	..	..	..	0.953 125
..	15/32	..	..	0.468 750	..	31/32	..	..	0.968 750
31/64	..	..	..	0.484 375	63/64	..	..	..	0.984 375
..	..	..	1/2	0.5	..	..	..	..	....

ASSIGNMENT:

Exercise I. Change the following fractions to decimals. Do not use the chart except for checking.

1. $\frac{3}{8}$
2. $\frac{1}{16}$
3. $\frac{15}{32}$
4. $\frac{5}{5}$
5. $\frac{9}{16}$
6. $\frac{6}{12}$
7. $\frac{1}{8}$
8. $\frac{3}{16}$
9. $\frac{7}{16}$
10. $\frac{5}{8}$
11. $\frac{8}{12}$
12. $\frac{7}{8}$
13. $\frac{1}{20}$
14. $\frac{5}{16}$
15. $\frac{9}{32}$

Exercise II. Change the following decimals to fractions and reduce to their lowest terms.

1. .8
2. .225
3. .75
4. .875
5. .4375
6. .0625
7. .8125
8. .15
9. .55
10. .90
11. .780
12. .125

13. Change two feet, ten inches to the decimal part of a yard.

14. Change 11" to the decimal part of a foot. Carry your answer out to four decimal places.

15. What decimal part of a yard is 18"?

16. What common fraction has the same value as:
    .4 .40 .400 .4000

17. What decimal part of an hour is 12 minutes?

18. Change the following decimals to the nearest 16th of an inch. Use the chart to check your answer.
    a. .8125 b. .4375 c. .1875 d. .5625

19. Using the decimal chart, change these decimals to fractions:
    a. .28125 b. .40625 c. .96875 d. .59375

20. Since there are 12 units in a dozen, what decimal part of a dozen are the following:
    a. 8 units b. 5 units c. 7 units d. 6 units

21. What decimal part of an hour is:

a. 24 min. b. 30 min. c. 15 min. d. 50 min.

22. What decimal part of a yard is:

a. $4\frac{1}{2}''$ b. 27" c. $13\frac{1}{2}''$ d. 24"

UNIT V - DECIMALS

Addition and Subtraction **Lesson No. 3**

OBJECTIVE: To review the procedure of adding and subtracting decimals.

RELATED INFORMATION:

The addition and subtraction of decimals will be very simple for you if you remember just one rule -- Keep the decimal points under each other in a straight line.

A. Example: 67.5 + 4.125 + 8.96

$$\begin{array}{rl} 67.500 & * \\ 4.125 & \\ \underline{8.960} & * \\ 80.585 & \end{array}$$

* Zeros have been added to fill the column. The value of a decimal does not change if zeros are added after the figures to the right of the decimal point.

Ex.: $.5 = \frac{5}{10}$, $.50 = \frac{50}{100}$, $.500 = \frac{500}{1000}$

All the above are equal to $\frac{1}{2}$. Their value was not changed by adding the zeros.

B. Example: Subtract 8.96 from 67.5

$$\begin{array}{rrl} & 67.50 & * \\ - & \underline{8.96} & \\ & 58.54 & \end{array}$$

* Should the larger number in subtracting not extend to as many decimal places as the smaller, zeros may be added to the right of the decimal without changing its value.

PROCEDURE:

Remembering to keep the decimal points in a straight line, write the following as the teacher dictates, and add the columns.

1. 1.34 + .0254 + .706 + .00503 + .0704
2. 36.04 + 9.00 + 547.0161 + 5.056 + 39.98
3. 14.0014 + 7.43 + 5.5 + 6.006
4. 2.1 + .003 + 103.5 + 17.205
5. 75.07 + 5.945 + 116.05 + 9.028

Subtract the following:

6. 306.6 - 32.09
7. 205.06 - 140.
8. 302.09 - 215.387
9. 1035.61 - 907.47
10. 78.5137 - 59.306

ASSIGNMENT:

1. Change $\frac{4}{5}$, $\frac{2}{3}$, $\frac{5}{6}$ and $\frac{3}{4}$ to decimals and add.

2. Change .5, 3.5, .75, and .4 to common fractions and add.

3. What is the difference between the first number and the second in the following problems?

a.	11.90	3.05
b.	5.98	4.50
c.	6.125	3.02
d.	402.5	23.09
e.	67.5132	49.607
f.	.263	.096

4. Add and check the following examples:

a.	b.	c.	d.
1.25	1.8	.379	24.056
57.	2.6	2.05	18.287
.32	.759	.876	.94
.18	.375	.91	7.876
48.	1.48	.8	.093

5. 35.8 + 8.07 + 81.54 - 2.69 + 38. - 12.20 =

6. .053 + 5.15 + .5 - 2.935 + .007 =

7. \$9.56 + \$3.65 + \$15.95 - \$6.98 + 75¢ =

8. 7.886 + 25.08 + 17.92 + 9.0 + 25.477 =

9. How much more than \$6.85 is \$12.10?

10. What number subtracted from \$30 gives \$8.25?

UNIT V - DECIMALS

Multiplication **Lesson No. 4**

OBJECTIVE: To practice multiplication of decimals as used in the trade.

RELATED INFORMATION:

Next to addition, multiplication is the most frequently used operation in arithmetic. It is used not only in figuring materials costs and labor costs, but also in the extension of invoices, purchase orders, etc. The terms used in multiplication are shown in the following example:

$$\begin{array}{rrl} & 2.5 & \text{multiplicand} \\ \times & 5 & \text{multiplier} \\ \hline & 12.5 & \text{product} \end{array}$$

PROCEDURE:

In multiplying, the most common error made is the wrong placement of the decimal point. To keep from making this mistake, follow these simple rules:

a. Multiply, as in whole numbers, paying no attention to the decimal point.

b. Count the number of decimal places in the two numbers you are multiplying.

c. In the product, count off from the right the combined number of places and insert the decimal point.

For example:

A. 3.69 x 7.8 2 places + 1 = 3 places in the product

$$\begin{array}{r} 3.69 \\ 7.8 \\ \hline 2952 \\ 2583 \\ \hline 28782 \end{array} = 28.782$$

Since there is one decimal place in the multiplier and 2 in the multiplicand, there is a total of 3 decimal places. Therefore, the decimal point in the product is placed before the 3rd figure counting from the right.

B. 12.75 x 12 — 2 places in just the multiplicand.

$$\begin{array}{r} 12.75 \\ \times \quad 12 \\ \hline 2550 \\ 1275 \\ \hline 15300 \end{array} = 153.00$$

Point off two places.

C. .25 x .25 — 2 places + 2 places = 4 places

$$\begin{array}{r} .25 \\ \times \; .25 \\ \hline 125 \\ 50 \\ \hline 625 \end{array} = .0625$$

Rule: Point off four places. Note that your answer consists of only three places. Therefore, a zero must be inserted to create the needed fourth place.

ASSIGNMENT:

1. Multiply the following:
   - a. 23 x .3
   - b. .25 x 5
   - c. 30.5 x 12.5
   - d. 302 x .009
   - e. 22.75 x 11
   - f. .235 x .25

2. If the cost of one 14" O. T. zipper was $0.1234, what would be the cost of 144 zippers?

3. A dressmaker bought 2 pieces of batiste, at $42\frac{1}{2}$¢ per yard. One piece measured $41\frac{3}{4}$ yards and the other $48\frac{1}{2}$ yards. What was the total cost?

4. Find the cost of the following:
   - a. 20 yards of drill cloth @ $22\frac{1}{2}$¢ per yard
   - b. 24 yards of dacron/cotton @ 75¢ per yd.
   - c. 13 yards of taffeta @ 85¢ per yard
   - d. 5 yards of organdy @ $62\frac{1}{2}$¢ per yard
   - e. 15 yards of percale @ $39\frac{1}{4}$¢ per yard

5. The following items were received at the beginning of the month. Figure the cost of each item.
   - a. 15 cones of white thread @ $1.42 per cone
   - b. 36 cards of middy braid @ 9¢ a card
   - c. 24 sets of chevrons @ 25¢ a set
   - d. 11 boxes of thread @ $2.48 a box

UNIT V - DECIMALS

Division Lesson No. 5

OBJECTIVE: To practice division of decimals as used in the trade.

RELATED INFORMATION:

The division of decimals is done essentially the same as for whole numbers except that the position of the decimal in the quotient is important. You know from previous lessons that the incorrect placement of the decimal point can completely change the value involved. The terms used in division are shown in the following example:

$$\begin{array}{rrl} & 2.15 & \text{quotient} \\ \text{divisor} & 5\overline{)10.75} & \text{dividend} \end{array}$$

PROCEDURE:

In the division of decimals you will come across three different types of problems:

A. Dividing a whole number into a number containing a decimal.

$5\overline{)10.75}$

First place the position of the decimal point for the quotient directly above the decimal point in the dividend.

$$\begin{array}{r} . \\ 5\overline{)10.75} \end{array}$$

Then divide $\begin{array}{r} 2.15 \\ 5\overline{)10.75} \end{array}$

This is the simplest of all types of division of decimals.

B. Dividing a whole number into a number where an exact answer is required to at least 3 decimal places.

$3\overline{)1073}$

First place the decimal point at the end of the dividend and add a zero or as many zeros as needed.

$3\overline{)1073.000}$

Place the decimal point for the quotient directly above the decimal point in the dividend.

$$\begin{array}{r} . \\ 3\overline{)1073.000} \end{array}$$

Then divide $\begin{array}{r} 357.666\frac{2}{3} \\ 3\overline{)1073.000} \end{array}$

C. Dividing a decimal number into a decimal number.

.78/93.99

First, to mark the correct position of the decimal point in the quotient:

a. Move the decimal point in the divisor to the extreme right, - in this case 2 places. .78 becomes 78.

b. Move the decimal point to the right the <u>same number</u> of spaces in the dividend (in this case, two places). 93.99 becomes 9399.

c. Mark the position in the quotient directly above the decimal point in the dividend.
78/9399.

d. Divide. You can see that this problem needs an additional zero. You may add as many zeros as needed to complete the problem.

```
    120.5
 78/9399.0
    78
    159
    156
      390
      390
```

D. Dividing a whole number by a decimal number.

Ex. Divide 326 by .25

First make the divisor a whole number by moving its decimal point to the right of the last figure (two places). .25./326

Add as many zeros to the dividend as are necessary to equal the number of places moved in the divisor (two places). 25/32600

By removing the decimal point in this manner, the quotient is a whole number.

```
   1304
25/32600
```

Can you explain what we are doing when we move the decimal point the same number of places in both divisor and dividend?

ASSIGNMENT: (Be sure to include the dollar sign in your answer when needed.)

1. $24.57 ÷ 9
2. 2.886 ÷ 6
3. $1.92 ÷ 8
4. .01875 ÷ .625
5. $8.38 ÷ .335
6. .1368 ÷ 38
7. 4.958 ÷ 74
8. 213.726 ÷ 537
9. 1.125 ÷ 10.3125
10. $10.28 ÷ 27½¢

11. In figuring the cost of a dress, $4.23 was allowed for fabric. How many yards @ 72¢ a yard can be used?

12. At $2.98 a yard, how many yards of silk can be bought for $17.14?

13. The area in shop that could be used for work tables was 8.5 feet wide and 25.5 feet long. How many times the width is the length?

14. At 24¢ a box, how many boxes can be purchased for $125.52?

15. A firm received 236 yards of fabric. The invoice amounted to $159.89. What was the cost per yard?

16. If an operator works 36 hours a week and makes a dress every 1.5 hours, how many dresses does she complete at the end of the week?

17. At $0.165 a dozen, how many dozen buttons can be bought for $18.15?

18. Divide each of the following by 3.1416

    a. 15, b. 17, c. 340

UNIT V - DECIMALS

Short Processes **Lesson No. 6**

OBJECTIVE: To learn short cut methods of working with decimals.

RELATED INFORMATION:

Time is one of the most important factors in successfully accommodating customers. Anything that helps to save time is of utmost importance. Whenever we wish to multiply or divide by such numbers as 10, 100, 1000, etc., we can save time by using short processes.

PROCEDURE:

Short processes for multiplication:

A. Find the following products:

(1) 10 x .035 (2) 10 x .35 (3) 10 x 3.5

What happens to the decimal point of the multiplicand when you multiply by 10?

B. Multiply the following:

(1) 100 x .035 (2) 100 x .35 (3) 100 x 3.5

What happens to the decimal point of the multiplicand when you multiply by 100?

C. Multiply the following:

(1) 1000 x .035 (2) 1000 x .35 (3) 1000 x 3.5

What happens to the decimal point of the multiplicand when you multiply by 1000?

The above examples teach you this simple rule:

To multiply a number

a. by 10, move the decimal point one place to the right.
b. by 100, move the decimal point two places to the right.
c. by 1000, move the decimal point three places to the right.

Remember that a whole number may be considered to have a decimal point after it.

59 = 59.

Practice: In the following examples write the product only:

1. 10 x 10.75
2. 100 x .1134
3. 10 x 652
4. 1000 x 32.1
5. 100 x 6.75
6. 1000 x .0065
7. 100 x 280
8. 10 x .67
9. 100 x 10.19

To multiply by 200, multiply by 2 and then move the decimal point two place to the right. How would you multiply by 300? 500?

Example: 200 x $4.75 = $950.00

Short Processes for Division:

To divide a number by:

a. 10, move its decimal point one place to the left.
b. 100, move its decimal point two places to the left.
c. 1000, move its decimal point three places to the left.

Practice: Using the short processes, divide:

1. 67.50 ÷ 10
2. 29.80 ÷ 10
3. 68.00 ÷ 100
4. 750.693 ÷ 1000
5. .57 ÷ 10
6. .069 ÷ 10

ASSIGNMENT:

1. If it costs $3.17 to make one dress, how much would 100 dresses cost at the same rate?

2. In a community chest drive, $98.50 was collected from 100 employees. What was the average per person?

3. If the average price of wool is $0.406 a pound and cotton is $0.2974 a pound:
    a. What is the price of 100 lbs. of each?
    b. What is the price of 1000 lbs. of each?

4. A buyer ordered 100 dresses @ $10.75 each. What was the total cash amount of her order?

5. Ten yards of taffeta @ 89¢ a yard was used in the making of a slip. What was the total cost of the taffeta?

6. If the bill for 100 zippers came to $27.85, what was the average cost per zipper?

UNIT V - DECIMALS

Rounding Off Decimals **Lesson No. 7**

OBJECTIVE: To learn the rule for rounding off decimals in the needle trades.

RELATED INFORMATION:

Many problems in decimals do not come out evenly and it is hard to determine just where to stop the process and still have a sufficiently accurate result. The number of decimal places to which answers should be carried is largely determined by the trade practice. In needle trades, it is sufficiently accurate to continue the problem until there are three decimal places in the answer. Then the answer is rounded off to two decimal places. The process of expressing a decimal to the degree of accuracy used in the trade is called "rounding off decimals".

PROCEDURE:

The following rules apply to most of the problems in the needle trades where the answer contains three decimal places "rounded off" to two decimal places:

1. If the third figure after the decimal point is 5 or more, the figure in the second decimal place is increased by 1(and the third figure is dropped).
2. If the figure in the third decimal place is less than 5, it is dropped.

Example: $2.5 \div .06 = 06.\overline{)250.000}$

$$\begin{array}{r} \underline{41.666} \\ 06.\overline{)250.000} \end{array}$$

a. Note that in the problem $.06\overline{)2.5}$, zeros are added in order to carry the quotient to three places.

b. Look at the third decimal place to determine whether or not the second digit should remain the same or be increased. $(.66\underline{6})$

c. In this case the digit, 6, is more than 5. The second-decimal-place figure is increased to 7. The answer is "rounded off" to 41.67.

Practice: Round off the following:

1. .756
2. $1.9575
3. 7.324
4. 29.409
5. 2.5644
6. 18.2702
7. 221.7557
8. .8967
9. $.625
10. 18.762

ASSIGNMENT: Round off the answers to the following problems to two decimal places:

1. 25.0097 + 0.9237 + 1.125
2. .7895 + .6842 + 12.7 + 231.0924
3. .1134 x 125
4. .7895 x 111
5. 4.125 x 1.51
6. 44.002 x 21.10
7. 3.1416 x 1.03
8. 8.75 ÷ .063
9. 1.5 ÷ 8.724
10. 215.00 ÷ 46
11. 936.06 ÷ 2.25
12. 128.5 ÷ 7.56
13. 19.575 - 8.756
14. 8.967 - .625
15. 25.6445 - 1.8762
16. 0.282 - 0.0924
17. .1134 - .0987
18. 1.056 - .565
19. 129.00 - 10.328
20. 11.7 - 8.032

UNIT V - DECIMALS

Computations Using Decimals **Lesson No. 8**

OBJECTIVE: To practice the use of decimals in various computations in the needle trades.

RELATED INFORMATION:

You have noticed that most of the calculations thus far have involved the use of money. Everything in a business costs money and every sound business must pay strict attention to money details. Thus far, we have considered materials costs and shipping costs. Later we will cover other costs that must be taken into consideration for a successful and profitable business.

PROCEDURE:

The following problem is used to show the losses that a firm could have if it did not figure its production to fill the demands of the day and if it did not keep a close check on waste. Many firms overproduce certain garments. In so doing, they may have more merchandise "on the racks" than they can really sell. These garments eventually are sold at a loss.

Example: A "lot" consisting of 350 dresses in style #802 was cut. A check showed that only 209 garments were sold. The materials cost for this style was \$2.93. What would be the total materials cost of the complete lot? What is the materials cost of the unsold garments? If, at the end of the season these garments were sold at a loss of $\frac{1}{2}$ the materials cost, what would the total loss be?

ASSIGNMENT:

1. The trimming buyer of Claudia Co. kept a stock of 6" neck zippers on hand. Due to the changes in fashion, there was no need for 6" zippers. If at the end of the year, 265 zippers were sold @ 3¢ and their original cost was \$0.065, what is the loss on one zipper? on the 265 zippers?

2. A manufacturer purchased 1050 yards of spun print @ 68¢ a yard to be used in style #805. In cutting the first lot, 455½ yards were used. The manufacturer soon found out that this particular style was not "reordering". Finding no other use for this fabric, the manufacturer sold it at \$0.435 per yard. What was the loss per yard? What was the total loss?

3. A firm purchased 675 zippers from Belbro Notion Company @ \$0.1387 each. At a later date, the firm decided to purchase the same amount of zippers directly from a zipper manufacturer and paid \$0.1134 each for the same type zipper. What was the saving per zipper when purchased directly from the manufacturer? What was the total saving?

4. A set of four rhinestone buttons costing 50¢ each appeared on the designer's "original" of style #607. To reproduce the style cheaply in quantity, the production department decided to use a similar but less expensive button selling @ 37¢ each. What was the total saved by using the less expensive button on 320 garments?

UNIT VI - PERCENTAGE

Pre-Test No. 6

Exercise I. **Fill in the missing figures.**

	Fraction	**Decimal**	**Percentage**
1.			50%
2.	$\frac{1}{3}$		
3.		.0625	
4.	$\frac{5}{12}$		
5.		$.66\frac{2}{3}$	
6.	$\frac{3}{8}$		
7.		.60	
8.			$87\frac{1}{2}$%
9.			5%
10.		.5625	

Exercise II.

1. What is the 2% sales tax on $748.50?
2. Change $6\frac{1}{5}$ to a decimal.
3. Find $\frac{1}{4}$% of 300.
4. What is the interest on $1500.00 @ $2\frac{1}{2}$%?
5. What is the percentage mark-down on a dress that originally sold for $69.00 and is now selling for $46.00?

Exercise III. Determine what percent

1. 36 is of 48.
2. 50 is of 75.
3. 8 is of 64.
4. 2 is of 5.
5. $\frac{1}{2}$ is of 4.

Exercise IV. Figure the following discounts:

1. 2% of $118.63.
2. 8% of $10.75.
3. $33\frac{1}{3}$% of $49.95.
4. 2% of $254.14.
5. 25% of $89.95.
6. 8% of $127.50.

Exercise V. Find the missing numbers if:

1. $12\frac{1}{2}$% of a number is 32 ________.
2. 6% of a number is 36 ________.
3. 80% of a number is 10.20 ________.
4. 15% of a number is 6.45 ________.
5. 35% of a number is .7945 ________.

CLEARANCE

33⅓% to 50% off

Profit Ratio At Big Stores Off To 2.8%; Sales Up

75% of Fall Budgets Spent By Apparel Buyers in June

Big Store April Sales Down 6%; Stocks Off 4%

Fur Workers, Makers Okay 3-Year Pact

Pay Raised 9-12%; Contracting Hit

Sales in Week At Department Stores Up 5%

RAYON MOVEMENTS DOWN 11% IN JUNE

65% Dacron & 35% pima cotton

THESE NEWSPAPER CLIPPINGS ILLUSTRATE THE USE OF PERCENTAGE TO EXPRESS SOME SITUATIONS RELATED TO THE NEEDLE TRADES.

UNIT VI - PERCENTAGE

Review Lesson No. 1

OBJECTIVE: To recall the terms and the uses of percentage.

RELATED INFORMATION:

Needle trades calculations in percentage have to do with determining rates or amounts of increase, decrease, discount, interest, commission, gain, loss, average, etc.

The term "per cent" means hundredths and instead of writing the word "per cent" each time, the symbol % is used. For instance, 12% means $\frac{12}{100}$. You will find the word used frequently in papers, magazines, on the radio, and television.

The principles of arithmetic found in percentage are similar to problems found in fractions. There can never be enough emphasis placed on accuracy in the use of fractions, as the needle trades worker uses fractions throughout her math work.

The only difference between finding a "per cent" of a number and finding the fractional part of a number is that in percentage a per cent (%) changed to a decimal fraction is used, and in finding a fractional part of a number a common fraction is used. Thus to find 50% of a number, 50% is changed to .50 (which is the same as finding $\frac{1}{2}$ of the number).

PROCEDURE:

The use of $\frac{100}{100}$ or 100% is the basis of comparison used in percentage. The percentage value is changed to the decimal system for ease in computing and accuracy in pointing off the number of decimal places.

Following is a table showing different ways of expressing fractions, decimals, and percentage:

Expressed in Words	Fraction	Decimals	Percentage
One-hundredths	$\frac{1}{100}$	.01	1%
Ten-hundredths	$\frac{10}{100}$	.10	10%
One hundred hundredths	$\frac{100}{100}$	1.00	100%
One hundred fifty hundredths	$\frac{150}{100}$	1.50	150%
One hundred seventy-five thousandths	$\frac{175}{1000}$	.175	17.5%

A. The rules for changing per cent to decimals:

Example: 12%

1. Remove the % sign. 12
2. Change to a decimal by placing a decimal point 2 digits to the left of the number for the given per cent. (Note that this is the same as dividing by 100.) .12

B. There are times when you will need to change a fraction into "percentage".

Example: $\frac{1}{8}$

1. First change the fraction into a decimal by dividing the numerator by the denominator as learned in the previous unit. $\begin{array}{r} .125 \\ \hline 8/1.000 \end{array}$
2. The decimal .125 is then changed into percent by moving the decimal point two places to the right. 12.5%

ASSIGNMENT:

Exercise I. Work out the following:

	Fraction	Decimal	Per Cent
1.	$\frac{7}{8}$		
2.	$\frac{5}{12}$		
3.	$\frac{1}{3}$		
4.	$\frac{5}{16}$		
5.	$\frac{3}{10}$		

Exercise II. Change these per cents to decimals:

6. $3\frac{4}{5}\%$

7. 110%

8. 18%

9. $16\frac{1}{2}\%$

10. 6%

Exercise III. Change these decimals to per cent:

11. .875

12. 1.625

13. .8

14. .1875

15. 2.15

16. If a cutter was asked to cut only $33\frac{1}{3}\%$ of 396 yards of material on hand, how many yards would he cut?

17. In checking your pre-test paper, you found you had $12\frac{1}{2}\%$ of the questions wrong. What fraction of the questions were wrong? There were 32 problems. How many were wrong?

18. A box holds 16 spools of thread when full. There are 5 spools left in the box at the end of the month. What per cent of spools remain in the box?

19. At the end of the summer season, bathing suits were marked down 20%. What would be the sale price of a suit that originally cost $17.95?

20. Bring to class 5 articles from newspapers or magazines that use per cent.

UNIT VI - PERCENTAGE

Types of Percentage **Lesson No. 2**

OBJECTIVE: To learn to solve the types of problems encountered in percentage.

RELATED INFORMATION:

In working with percentage it is important to completely understand the problem. Three terms are used in percentage: base, rate, and percentage. The base is the number on which the percentage is computed; it represents the whole or 100%. The rate shows how many hundredths are used. The percentage is the product of the base and the rate. For example: in the problem of finding 5% of $625, $625 is the base, 5% is the rate, and $3.25 is the percentage.

PROCEDURE:

There are three distinct kinds of problems involving percentage:

TYPE A. Finding a certain per cent of a number.

Example: A store advertised that dresses originally priced at $12.98 would be reduced 25%. How much is actually deducted from the selling price?

1. Change the per cent to a decimal. 25% = .25
2. Multiply the number by the decimal.

$$\begin{array}{r} \$12.98 \\ \underline{\times .25} \\ 6490 \\ \underline{2596} \\ 32450 = \$3.25 \end{array}$$

Rule: Base x rate = percentage
$12.98 x 25% = $3.25 (amount of reduction)

TYPE B. Finding what per cent one number is of another.

Example: Fabric which had been selling for 96¢ a yard was reduced 35¢ on a yard. What per cent of the original selling price was the discount price?

1. Write the fractional part one number is of the other. $\frac{35}{96}$

2. Change this fraction to a decimal.

```
      .3645
96/35.00
   28 8
    6 20
    5 76
      440
      384
       56
```

3. Change the decimal to per cent.

.365 = 36.5%

Rule: Percentage ÷ base = rate
35 ÷ 96 = 36.5%

TYPE C. Finding a number when the per cent of it is known.

Example: At the end of the season, fabric was sold for $1200. This amount was 64% of its original cost. What was the original cost of the fabric?

1. Change the per cent to a decimal. 64% = .64

2. Divide the per cent into the number given.

```
.64/1200.00
    1875.00
```

Rule: Percentage ÷ rate = base
$1200 ÷ 64% = $1875

ASSIGNMENT:

1. Work the following problems:

   a. 10% of 65
   b. 12% of 14
   c. 72% of 450
   d. 65% of 48
   e. 3% of 100
   f. 100% of 764
   g. 25% of 1086
   h. 2% of 28
   i. 86% of 230.30
   j. 34% of 17.6

2. If \$9.00 was 16% of a girl's weekly salary, what did she earn in a week? In 24 weeks?

3. A sewing machine costing \$255.00 was sold at a loss of $33\frac{1}{3}\%$. What was the selling price?

4. $37\frac{1}{2}\%$ of an operator's yearly income is \$1135.00; what is her yearly income?

5. A two-piece dress which takes an operator 3 hours to make requires 12% of the time on the skirt. How many hours were spent on the jacket?

6. In calculating the selling price of a garment, 30% of the selling price was allowed for mark-up. What is the cost of a garment that sells for \$12.75?

7. The following ad appeared in a newspaper:

FINAL CLEARANCE ON ALL SUMMER FASHIONS

a.	Dresses	\$69.95	Reduced	$33\frac{1}{3}\%$
b.	Suits and Coats	159.00	Reduced	30%
c.	Gowns	245.00	Reduced	25%
d.	Separates	14.95	Reduced	33%

What is the amount of reduction and final discount price on each item?

8. In a school of 450 students 22% were absent one day due to a heavy storm. How many students were absent?

9. A forelady in a shop who was being paid $1.90 an hour, received a notice in her pay envelope stating that because of good work her hourly rate would be increased 10%. What will be her daily increase if she works 7 hours?

10. The net profits of a business for one year were $190,000. The following year they were $4\frac{3}{4}$% greater. How much was the increase in profits in the second year?

11. Following is a list of items that are being sold at a discount. Figure the percentage of discount on each.

	Original Price	Selling Price	% Discount
a.	$387.00	$129.00	
b.	169.00	98.02	
c.	129.00	79.98	
d.	69.95	34.97	
e.	89.95	67.47	

UNIT VI - PERCENTAGE

Commercial Discounts — Lesson No. 3

OBJECTIVE: To develop an understanding of the application of percentage as used in commercial discounts.

RELATED INFORMATION:

As you know, goods are often sold for less than the marked price. When goods are sold for less than the marked price, they are said to be discounted. Of the four chief kinds of discount, which are cash, quantity, special sale, and trade discounts, the last (trade discounts) is the most common in the needle trades field. Trade discount is discount given by a wholesaler to a retailer. In the manufacturing of garments the allowance of 8% discount is generally given to the retailer. The terms stated are usually 8/10 E. O. M. which means eight per cent discount is allowed up to ten days after the end of the month.

The manufacturer in turn is allowed trade discounts, usually 1% or 2%, on fabrics, findings, etc.

PROCEDURE:

The following terms are a few of the discounts allowed in the needle trades field, both in manufacturing and retailing.

A. 8/10 E. O. M.

$$\begin{array}{r} \$76.50 \\ \underline{.08} \\ \$6.1200 \end{array}$$

Example: On June 23rd a retail customer bought 6 dresses @ $12.75 making a total of $76.50 due the manufacturer. The discount allowed was 8/10 E. O. M. What was the discount allowed and up to what date could this deduction be made?

Answer: A discount of $6.12 was allowed up to July 10th.

B. 1% net E. O. M. (One per cent allowed before the end of the month)

$$\begin{array}{r} \$29.10 \\ \underline{.01} \\ \$.2910 \end{array}$$

Example: A manufacturer was allowed the above discount on a bill for zippers dated June 10th, amounting to $29.10. What was the discount allowed and up to what date could this deduction be made?

Answer: A discount of 29¢ was allowed up to June 30th.

C. 2% net 10/60

$565.00
.02
$11,3000

Example: A manufacturer was allowed the above discount on a bill for piece goods amounting to $565.00 purchased on June 14th. What was the discount allowed if the bill was paid on July 30th?

Answer: The above term means that 2% is allowed up to 70 days. Since July 30th falls within that time, 2% or $11.30 can be deducted from this bill.

D. Series Discounts

Some dealers allow two or more discounts, called chain discounts or series discounts. This method of discount is figured as follows: find the discount allowed at the first rate and subtract it from the price; then find the discount on the balance at the given rate, and subtract it from the first discounted price. This is the new cost.

Example: For a cash payment, a $350.00 television set is given chain discounts of 7% and 5%. Find the cash payment.

$350.00	$350.00	$325.50	
.07	- 24.50	- 16.28	
$24.50	325.50	$309.22	cash payment
	.05		
	$16.2750		

ASSIGNMENT:

1. During an end-of-the-season sale, a store offered spring coats at a discount of 25%. What would be the discount allowed on a coat marked $50.00?

2. The following amounts were billed to a retail store for garments purchased: $100.50, $64.50, $21.50, $12.75. The discount allowed was 8%. What was the amount of the check needed for the payment of these bills?

3. A manufacturer received the following bills for shipments of fabrics during the month of June: $470.25, $201.85, $565.01, $121.41. What is the amount of discount allowed @ 2% net/60?

4. On June 10th, a manufacturer received a package of buttons amounting to $46.50. The discount allowed was 1% E.O.M. What is the amount of the discount and when is the discounted bill due?

5. Some retail stores give a 2% discount for cash. If you purchased several items amounting to $22.50 and you paid cash, how much did you pay for them?

6. A 6% discount was allowed on a formal gown marked $98.95. A month later the same gown was again reduced 8%. Find the final selling price.

7. Employees in a retail shop are allowed 30% discount. If an employee bought a coat marked $90.00, what did she pay for it?

8. Find the amount due on the following statements received:

	Amount of Statement	Discount Allowed	Amount of Discount	Amount Paid
a.	$96.40	8%		
b.	$3628.50	2%		
c.	$335.45	$33\frac{1}{3}$%		
e.	$297.24	3%		
f.	$352.56	1%		

9. Clara bought a typewriter for $74.00 and received chain discounts of 3% and 2%. Find the cost of the typewriter.

10. Make out a bill for the following items:

$3\frac{1}{4}$ yds. of silk @ $1.25 per yd.
$1\frac{1}{4}$ yds. pellon @ 59¢ per yd.
$5\frac{1}{8}$ yds. dacron/cotton @ 79¢ per yd.
9 buttons @ 72¢ adoz.
4 spools of thread @ 39¢ a spool

Discount 5% for cash.
What is the amount of the cash payment?

11. Are chain discounts of 4%, 4%, and 2% greater, less, or the same amount as a flat 10% discount? Explain your answer.

UNIT VI - PERCENTAGE

Commissions **Lesson No. 4**

OBJECTIVE: To learn how to use percentage in figuring commissions.

RELATED INFORMATION:

Some people are paid for their work at the end of each week, others at the end of two weeks, and still others at the end of each month. The money that these people receive is called wages or salaries. As you know, people who sell things are often paid a certain per cent of the sale price of what they sell. The money that these agents receive is called commission. Commissions are usually expressed in per cent.

PROCEDURE:

Commissions can be paid at any agreed figure. Some salesmen are paid both a salary and commission, others are paid a commission only, and still others are paid a salary plus a commission on merchandise sold above a certain figure.

Example: Joan is a salesgirl and receives a salary of $40.00 a week plus 2% commission on all sales made. What is her commission on sales of $235.00? What are her total earnings?

Answer:	$235.00	$40.00
	.02	5.70
	$ 5.70	$45.70 total earnings

ASSIGNMENT:

1. Mr. Jones works for Junior Miss Dress Company and receives a commission of 7% of the total net monthly sales. For the month of June his net sales were $21,350.75. What are his total earnings for the month of June?

2. Find the commission earned by each of the following salesmen for the month of May. The commission rate is 6%.

Salesmen	Amount of Sales
A.	$18,750.50
B.	$25,675.75
C.	$16,320.00
D.	$10,550.50
E.	$20,125.25

What was the total of commissions paid out to salesmen?

3. Suppose you are a clerk and are given $4\frac{1}{2}$% commission on the amount of your sales. What is your commission on a sale of (a) $1.00? on (b) $10.00? on a sale of (c) $100?

4. Mr. Lee is paid a salary of $200 a month plus 5% commission on net sales. For the month of May his gross sales were $15,250.25 and returns amounted to $1400.00. What were his earnings for the month of May?

5. What is the commission at 8% on (a) a dress that sells for $12.75? (b) on 25 dresses? (c) on 75 dresses?

6. Mr. Jones received a commission of 5% on the first $10,000 of merchandise sold and 2% on any amount over $10,000. At this rate what would he earn on $18,750.00?

UNIT VI - PERCENTAGE

Interest **Lesson No. 5**

OBJECTIVE: To learn to figure simple interest on money borrowed.

RELATED INFORMATION:

When you borrow money, a certain sum, called interest, is paid for the use of this money. The amount of money, for the use of which interest is charged, is called the principal.

Very often businessmen borrow money to help them in their business. With good management they can often make more money by borrowing than by not borrowing.

PROCEDURE:

The amount of interest paid for the use of money depends upon three things: (1) the principal, that is, the amount of money borrowed; (2) the time for which the principal is used; (3) the rate of interest charged. The term rate of interest means a certain per cent of the principal for one year. For computing interest, the year is divided into 12 months of 30 days each. The date of maturity, or the day the money is due, is found by counting the days.

The following formula is a helpful way to find interest:

Interest = principal X rate X time (expressed in terms of years.)

You can write the formula I = prt.

Example A: Find the interest for one year on $575.00 at the rate of 6%.

$575.00	1. Change the per cent to a decimal.
x .06	
$ 34.50	2. Multiply the principal by the per cent.
	Find the interest if the above loan was made for just 60 days. Using 30 days as one month, 60 days equals two months or $\frac{2}{12}$ of a year, which equals $\frac{1}{6}$.
$ 5.75 6/$34.50	
	Divide the amount of yearly interest by 6.

Notice that the interest on any sum of money @ 6% for 60 days is 1% of the principal. Therefore, this simple rule applies: To find the interest on any sum for 60 days at 6%, just move the decimal two places to the left.

Example: $575.00 = principal
$5.75 = interest for 60 days @ 6%

Example B: Find the interest on $2400 for 3 years, 7 months, 18 days at 6%.

Solution:

Interest on $1 for 3 yrs. at 6%	=	$0.18
Interest on $1 for 7 mos. at 6%	=	0.035
Interest on $1 for 18 days at 6%	=	0.003
Interest on $1 for 3 yrs. 7 mos. 18 days	=	$0.218

Therefore the interest on $2400 equals

2400 x $0.218 = $523.20

Example C: Sometimes you know the amount of interest paid and wish to calculate the rate. You can also use the formula to find the missing rate of interest.

The formula is then changed into the form:

$$r = \frac{I}{pt.}$$

What is the annual rate of interest if the annual interest on a principal of $250 is $10?

Solution:

[redacted]

$$r = \frac{10}{250} \qquad 250\overline{)\overset{.04}{10.00}} = 4\%$$

ASSIGNMENT:

1. Mr. Green borrowed $4000 from the bank for 6 months @ 5%. How much interest did Mr. Green pay?

2. Lois can buy a sewing machine if she borrows $120. She will have to pay $8 a month for 18 months. If she buys the machine she can make 36 dresses in a year. She figures she will make an average profit of $7 a dress. Do you think she should borrow the money and buy the sewing machine? Prove you are right.

3. Find the interest on the following sums for 60 days @ 6%.
(a) $865, (b) $14.50, (c) $893.75, (d) $1355, (e) $367.80

4. Find (a) the date of maturity for each of the following loans; (b) the amount of interest due on the notes at the date of maturity:

	Date	Time	Interest Rate	Principal
a.	May 1	60 days	6%	$600
b.	May 15	2 mos.	6%	$750
c.	March 11	150 days	6%	$500

5. Find the interest on each sum for 60 days @ 6%, 7%, 5%, and 4%:

(a) $150, (b) 216, (c) $960, (d) 120, (e) $90

6. Find the annual rate of interest for the following loans:

	Amount Borrowed	Time	Amount Paid Bank
a.	$300.00	6 mos.	$318.00
b.	150.00	90 days	153.00
c.	200.00	6 mos.	206.00
d.	200.00	1 yr.	206.00
e.	200.00	3 mos.	206.00
f.	350.00	1 yr.	374.50
g.	80.00	30 days	81.00
h.	674.00	60 days	680.74

7. Compare the rate of interest on a loan of $500 for a year on which $30 interest was paid and a loan of $1000 for 6 months on which $30.00 interest was paid.

8. Find the interest on the following:

a. $4000 for 3 yr., 4 mos., 18 days @ 6%
b. $3200 for 1 yr., 1 mo., 15 days @ 6%
c. $500 for 2 yr., 3 mos., 11 days @ 6%
d. $4400 for 4 yr., 3 mos., 9 days @ 6%

9. Find the missing item in each of the following exercises:

	I.	P.	R.	T.
a.	---	$1500	3%	4 yrs.
b.	$70	$350	---	5 yrs.
c.	$81	---	6%	3 yrs.
d.	$350	$2000	---	7 yrs.
e.	---	$1500	3½%	5 yrs.

Determining Selling Prices

OBJECTIVES: To learn the use of percentage in determining selling price.

To understand the importance of overhead costs in determining selling price.

RELATED INFORMATION:

As a business is operated for profit, it is obvious that the owner will obtain for each item that he sells a price that is as high as is practicable.

The basic factors in determining the selling price of goods are: cost of materials used, labor costs, and operating expenses or overhead expenses, which include rent, taxes, heat, light and power, salaries other than factory, depreciation, supplies, etc. Quite often overhead costs run up as high as 25% of the total sales.

As the selling price includes everything (the cost of the merchandise, overhead expenses, and the net profit), it is the whole amount and should be used as the base, or 100 per cent. Then the cost of the merchandise, the various overhead expenses, the net profit, the margin, and practically all financial items, can be stated as percentages of the sales of the business.

PROCEDURE:

In determining the selling price, a manufacturer usually sets a certain per cent of materials and labor costs to cover his overhead and profit.

Example A: Determining selling price when the cost, the rate of overhead, and the rate of profit are known.

The president of Junior Miss Dress Co. has figured that 18% of the sales must be allowed for overhead expenses. He also wishes to make a net profit of 10% of his sales. At what price should he mark an article that costs him $10.80?

Solution:

Selling price = ... 100%

Overhead Expenses = 18% of S. P.
Net Profit = 10% of S. P.
28%
Balance is cost 72%
100%

That is, $10. 80 = 72% of S. P.

Therefore $10. 80 ÷ . 72 = $15. 00 Selling Price

Check:

18% of $15. 00 = $2. 70
10% of $15. 00 = 1. 50
Cost of article = 10. 80
$15. 00 = 100% or Selling Price

Example B: A merchant buys a hat for $3. 00 and sells it for $4. 00. What is his per cent of profit?

Solution:

The base is $4. 00 and the percentage is $1. 00. The rate or per cent of profit is $\frac{1}{4}$ = 25%

Proof: $4. 00
x . 25
2000
800
$1. 0000 = $1. 00 or 25% of S. P.

Example C: The Jean & Jane Dress Store sold a dress for $75. 00 with a gross profit of 35%. What was the cost?

Solution:

Since the selling price is taken as 100%, the cost is 65% of the selling price, hence the cost is

$75. 00 x 65% = $48. 75 = cost of dress

ASSIGNMENT:

1. Find the selling price of each of the following:

	Cost	Overhead	Rate of Profit
a.	$12.50	20% of S. P.	15% of S. P.
b.	52.25	15% of S. P.	21% of S. P.
c.	15.00	17% of S. P.	8% of S. P.
d.	6.50	30% of S. P.	16.5% of S. P.

2. A haberdasher's overhead is 24½% of his sales. He pays $1.33 each for men's shirts and clears 9% on his sales. At what price should he sell them?

3. Find the wholesale price of the following styles if the overhead expense is figured @ 22% of the sales and the profit at 12%:

a.	Style #896	cost $7.47
b.	Style #335	cost 8.96
c.	Style #819	cost 15.60
d.	Style #835	cost 25.45
e.	Style #847	cost 3.87

4. If you want to make a net profit of 10% on a coat that cost $40, and your cost of doing business is 16%, what should you set as its selling price?

5. If an article costs you $30 and you sell it for $40, what is your per cent of profit when your cost of doing business is 15%?

6. If you know the cost, selling price, and the profit, how can you find the per cent of overhead based on the selling price?

7. A merchant's overhead expenses average 17% of his sales. At what price must he sell an article which cost him $24.75, if he expects to make a net profit of 10% on his sales?

8. Find the cost of the following items for sale in the Kirsch Co. store:

		Selling Price	Gross Profit
a.	Dresses	$9.95	48.6%
b.	Coats	$59.95	39.8%
c.	Shorts	$4.99	36%
d.	Blouses	$2.99	25%
e.	Suits	$39.95	41%

UNIT VII - GEOMETRIC FORMS

Pre-Test No. 7

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1. How does a square differ from a rectangle?

2. All of a six-storey building's 204' by 78' inside measure is occupied by the R & K Department store. How many square feet of floor space are occupied?

3. How many square feet in two square yards?

4. Find the area of a square 6' wide and 6' long.

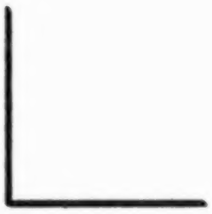
5. Find the area of a rectangle 3 feet wide and 6 feet long.

6. How many square feet of floor space will be taken up by a cutting table $4\frac{1}{2}$ feet wide and 28 feet long?

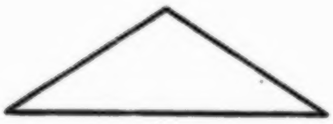
7. What is the perimeter of a placemat which measures 18" long and 12" wide?

8. Draw a 4" circle. Give its circumference and area.

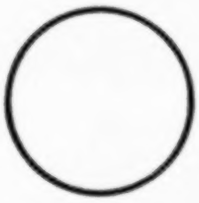
9. Identify the following geometric forms:



a



b



c

10. Find the missing values in each of the following:

	Circumference	Diameter	Radius
a.	88 inches		
b.		35 feet	
c.	154 feet		

UNIT VII - GOEMETRIC FORMS

Definitions of Geometric Forms **Lesson No. 1**

OBJECTIVE: To learn to identify geometric forms.

RELATED INFORMATION:

In the study of geometry, we compare lines, angles, surfaces, and solids and we note the characteristics of such figures as the circle, square, rectangle, and triangle. A flat surface has two dimensions, length and width.

Needle-trade workers use angles and lines constantly in their work, especially in the making of patterns, placing of tucks, hemlines, necklines, and accessories.

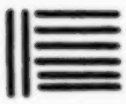
PROCEDURE:

It is important to recognize the following lines and angles:

A vertical line is a straight line whose direction is toward the center of the earth.

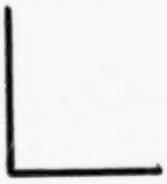
A horizontal line is parallel with the horizon, and is perpendicular to a vertical line.

An oblique line is a straight line whose direction is neither vertical nor horizontal.

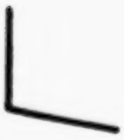


Parallel lines are two or more lines running in the same direction which are equidistant from each other, and which will never meet.

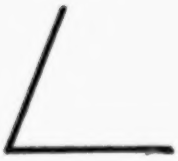
An angle is formed when two lines running in different directions meet.



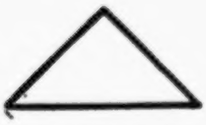
A right angle is one of the four equal angles formed by the intersection of two lines which are perpendicular to each other.



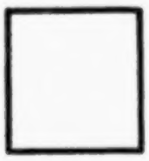
An obtuse angle is greater than a right angle.



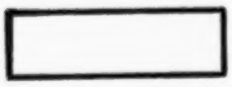
An acute angle is smaller than a right angle.



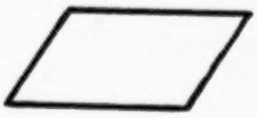
A triangle is a plane surface bounded by three straight lines.



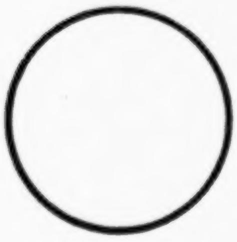
A square has four equal sides and four right angles.



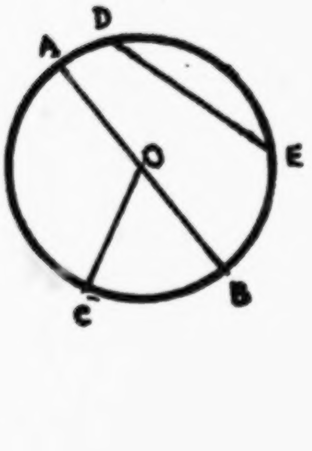
A rectangle has four straight sides with opposite sides equal and four right angles.



A parallelogram has four straight sides, the opposite sides of which are parallel to each other.



A circle is a plane surface bounded by a single curved line called its circumference, every point on which is equidistant from the center.



Parts of a circle:

A chord (DE) is a line joining any two points on a circle.

A diameter (AB) is a chord which passes through the center.

A radius (CO) is a line drawn from the center to any point on the circle. (OA and OB are also radii).

A circumference is the length of the circle.

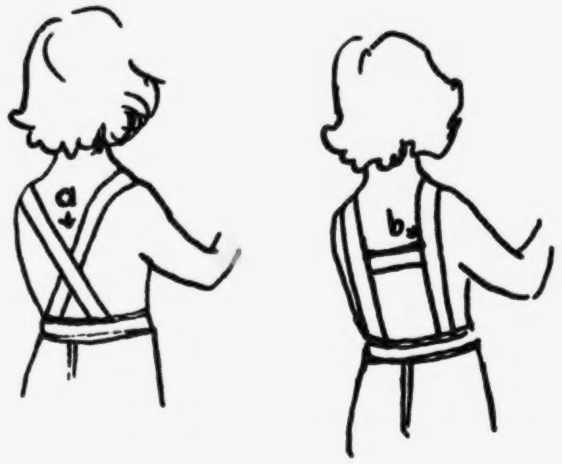
ASSIGNMENT:

1. Using the clock as reference, tell what type of angle is formed when hands show the following time:

   a. 3:00
   b. 2:45
   c. 5:45
   d. 6:45
   e. 1:30
   f. 9:00
   g. 4:15
   h. 10:20
   i. 12:55

2.

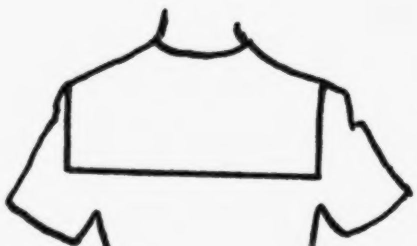
What type of angle is formed where the overall straps cross in view a ? Where they join the cross-tab in view b?



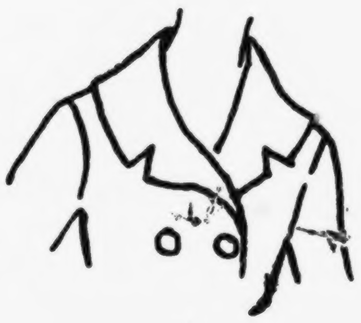
3. In preparing a dress for smocking, in what direction do the lines which form the transfer dots, or guide dots, run?

4. In basting a center back or center front guide line, what kind of line is used?

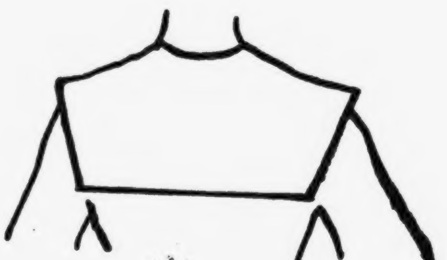
5. What types of angles are found in collar (a)? (b)? (c)?



a

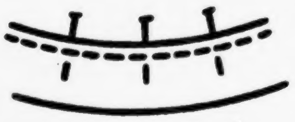


b

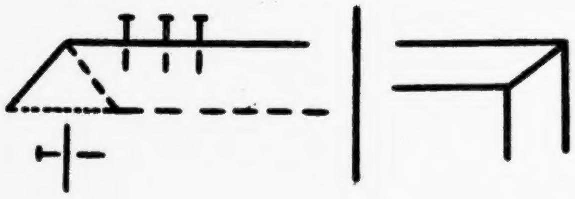


c

6. At what angle to the stitching are pins placed when the hem is pinned?



7. A mitered corner forms what kind of angle?



8. What kind of plane surface is a pocket 4" by 4"?

9. A linen guest towel measures 12" by 18". What is its shape?

10. From fashion magazine or newspaper, bring into class five designs using geometric forms.

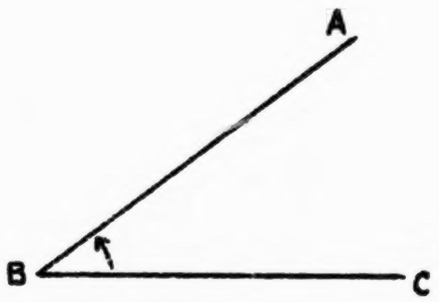
UNIT VII - GEOMETRIC FORMS

Angles **Lesson No. 2**

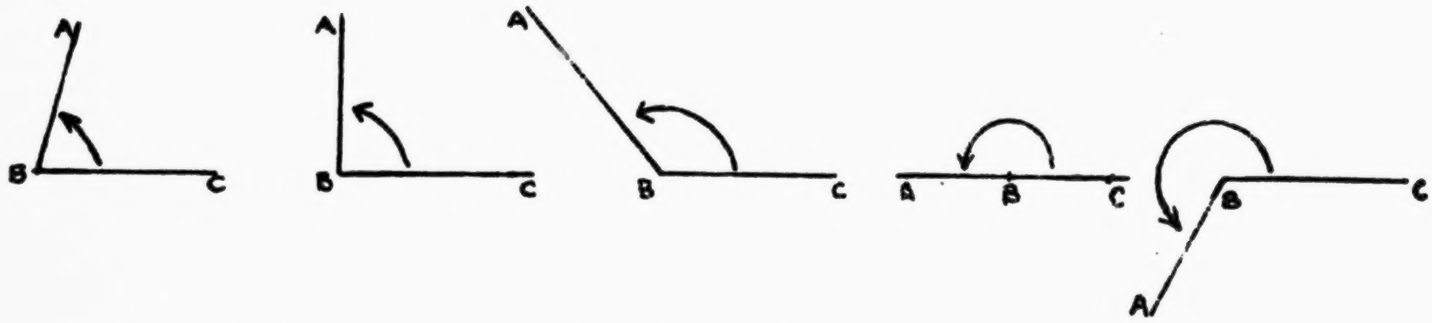
OBJECTIVE: To learn the kinds of angles and how to measure and draw an angle.

RELATED INFORMATION:

An angle is the amount of turning between two lines that meet at a point. The point where the two lines meet is called the vertex of the angle. In the figure shown, B is the vertex of the angle ABC (∠ABC), and AB and BC are the sides.

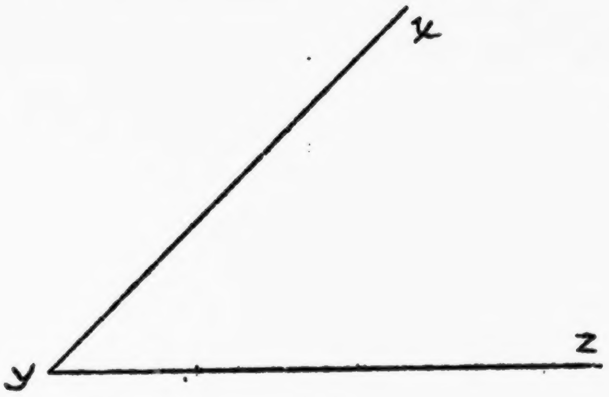


An arc drawn within the angle shows the amount of turning. In the series of angles shown below, as line AB turns in a counterclockwise direction, a larger angle is formed. To measure angles, a complete turn is divided into 360 equal parts, known as degrees (360°). A right angle is a quarter of a turn and has 90°. An angle that is less than a right angle is called an acute angle. An angle that is greater than a right angle is called an obtuse angle. If an angle is larger than a straight angle, it is called a reflex angle.



The tool used to measure or draw an angle is a protractor. The protractor has two semicircular scales. The outer one reads from 0° at the left to 180° at the right. The inner scale reads from 0° at the right to 180° at the left.

PROCEDURE:



To measure any angle, such as ∠XYZ, place the center of the protractor at vertex Y and the zero line exactly on side YZ. Begin at the 0° mark on the scale and follow to the point where the other side of the angle (XY) crosses the scale. You will see that the line crosses at 45°, which is the size of ∠XYZ. What kind of angle is ∠XYZ?

(If the side of an angle being measured is not long enough to meet the scale on the protractor, either lengthen the side or place the edge of a sheet of paper or a ruler so it falls on the side of the angle. Then read the scale where the paper or ruler crosses the protractor.)

To draw an angle of a given size, for example 45°, draw a line YZ with the edge of the protractor. Then place the protractor so that its center lies at the point where you wish the vertex to be. Be sure the zero line falls on line YZ. Locate 45° on the scale and make a dot with your pencil at that point. Label that point Z. Connect Y to that point with a line YZ.

ASSIGNMENT:

1. How many degrees are there in:

   a. $\frac{3}{4}$ of a complete turn of one side of an angle from the other?

   b. $\frac{1}{2}$ of a straight angle?

   c. $\frac{1}{2}$ of a right angle?

2. How can you tell whether an angle is acute, right, or obtuse by using the corner of a sheet of paper?

3. What effect has the length of the sides of an angle on its size?

4. Use the protractor to draw angles of 30°, 75°, 90°, 120°.

UNIT VII - GEOMETRIC FORMS

Geometric Constructions **Lesson No. 3**

OBJECTIVE: To learn a few fundamental constructions that will aid in constructing patterns and complicated designs.

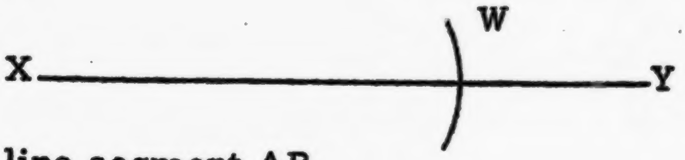
RELATED INFORMATION:

To make constructions, a straight edge and compass are needed.

To draw a line segment equal to AB:

1. Draw XY, any working line.

2. Find the length of AB by adjusting the compasses so that the metal tip falls at one end and the pencil tip at the other end.
3. With point X as a center and a radius equal to AB, draw an arc intersecting XY at W.

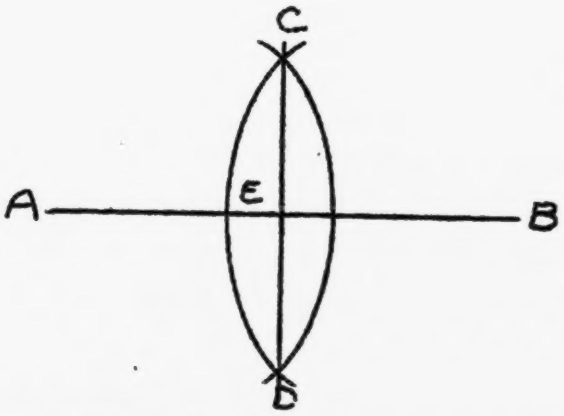


4. XW will equal the given line segment AB.

How can you construct a segment which is twice as long as a given segment?

PROCEDURE:

A. To bisect a given line segment.



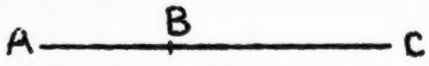
Suppose you wish to bisect line segment AB. With point A as a center and any radius more than half the length of AB, draw an arc as shown. With point B as a center, and the same radius, draw an arc intersecting the first arc, forming points C and D. Draw line CD intersecting AB at E. Then E is the mid-point of AB.

Notice that it takes two points to determine or fix the position of line CD.

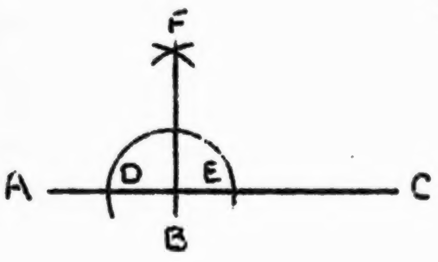
In this construction CD is also perpendicular to AB. Hence CD is called the perpendicular bisector of AB.

B. To construct a perpendicular.

To construct a perpendicular at a point on a line, not the center (point B on line AC):



1. With point B as a center and any convenient radius, draw an arc intersecting AC at points D and E.

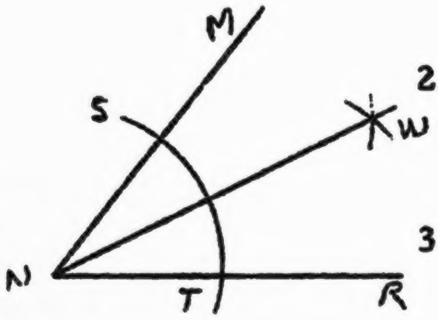


2. With any greater radius and points D and E as centers, draw arcs intersecting above line AC at point F.

3. Draw BF. BF is perpendicular (⊥) to AC at point B.

C. To bisect an angle.

∠ MNR is to be divided into two equal parts.



1. With point N as a center and any convenient radius, draw an arc intersecting the sides of the angle at S and T.

2. With the same radius, or any radius over half the distance between S and T, and with point S as a center, draw an arc within the angle.

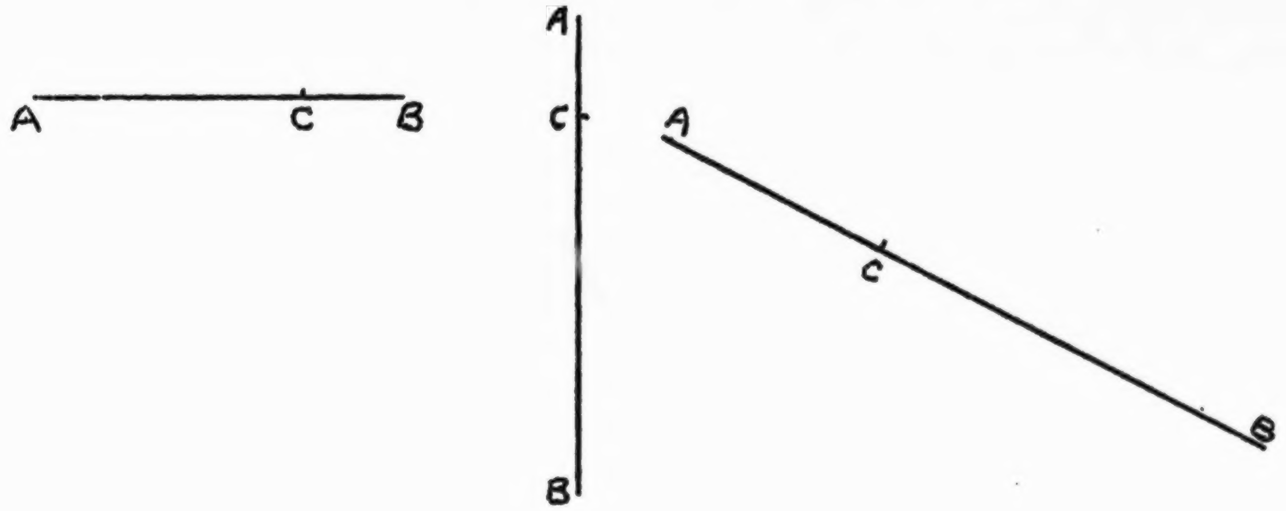
3. With point T as a center and the same radius used in step 2, draw an arc intersecting the first arc at point W.

4. Draw line NW. NW bisects ∠ MNR.

ASSIGNMENT:

1. Draw a line on your paper $3\frac{7}{8}''$ long. Bisect it using compass and ruler.

2. Draw lines on your paper equal to those shown here. Construct a line perpendicular to AB at point C in each case.



3. Construct a 45° angle with only a compass and an unmarked straight edge.

Rectangle and Square

Lesson No. 4

OBJECTIVES: To learn how to find the area and the perimeter of a rectangle and a square.
To learn how to apply this information to the trade.

RELATED INFORMATION:

Areas are calculated by means of units of square measure in much the same manner that lengths and distances are calculated by units of linear measure. However, in calculating areas, the two dimensions representing length and width are multiplied together. Their product gives the area.

If the dimensions are in inches their product is square inches, and the area is in square inches, abbreviated sq. in. If the dimensions are in feet, their product is in square feet, abbreviated sq. ft.; if in yards, their product is square yards, abbreviated sq. yd. and the area is in square yards; and so on.

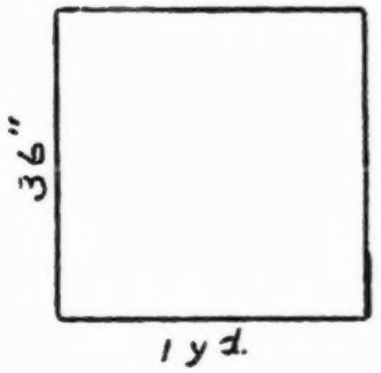
Square Measure

144 square inches (sq. in.) = 1 square foot
9 square feet (sq. ft.) = 1 square yard
1296 square inches = 1 square yard

PROCEDURE:

In this lesson we will cover the calculation of areas of squares and rectangles.

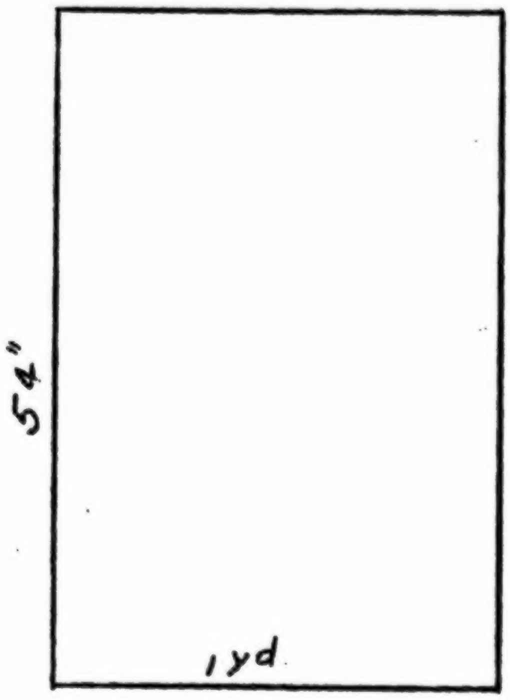
THE SQUARE



The square is a plane figure having four equal sides and four square or right-angle corners. Referring to the figure to the left, the area of a square is equal to the length multiplied by the width. Since the length is the same as the width, the area of a square is equal to the square of a side (that is, the length of a side multiplied by itself).

This figure represents fabric 36" wide and 1 yard long. Since 1 yard is 36", to find the area of this material in inches, you would multiply 36" x 36" = 1296 square inches. What is the area in square yards?

THE RECTANGLE



A rectangle, sometimes called an oblong, is a plane figure also having four sides and four square or right-angle corners. It differs from a square in that only the opposite sides are equal.

By referring to the figure at the left, the area of a rectangle is expressed as the product of the length and the width.

This figure represents fabric 54" wide and 1 yard or 36" in length. The area of this material is 54" x 36" or 1944 sq. in. What is the area in square yards?

A distinction must be made between area and perimeter. The perimeter of a plane surface is the distance around it, and the area is the number of units of area on its surface.

What is the perimeter of the rectangle at the right? Notice that there are two sides each 6 yards long, and 2 sides 54" wide. The perimeter may be expressed as

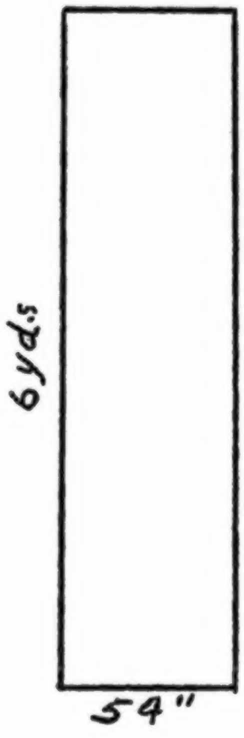
$$2L + 2W = p$$

Substitute the dimensions of the rectangle for the letters in this formula and see what the result is:

$2 \times 6 + 2 \times 1\frac{1}{2}$ (54") = perimeter

$12 + 3$ = 15 yards

In a square, L would equal W. We could just use the letter S for any side. What then would be the formula for the perimeter of a square?



ASSIGNMENT:

1. How many square feet of floor space will be taken up by a cutting table 4 feet wide and 22 feet long?

2. How many square inches is taken up in a yard of 36" material if the pattern piece to be cut measures 12" wide and 18" long? How many pattern pieces can be cut from the yard of material?

3. How many square yards are in a piece of fabric measuring 60" wide and $4\frac{3}{4}$ yds. long?

4. How many square yards of 36" material are required to make four pairs of cafe curtains if each curtain measures 3 feet wide and 2 feet long?

5. How many handkerchiefs 10" square can be cut from a piece of linen whose width is 10" and whose length is (a) $1\frac{1}{9}$ yd.? (b) 2 yards 8"? (c) 4 yards? (d) 20 yards?

6. How many square feet of floor space is taken up in a shop by the following equipment?

26 sewing machines	24" wide and 48" long
2 cutting tables	$3\frac{1}{2}$ feet wide and 7 feet long
2 work benches	5 feet wide and 8 feet long
1 ironing table	5 feet wide and 7 feet long

7. What is the area of the following? Indicate for each the name of the plane figure.

45" by 45" tablecloth
52" by 68" tablecloth
64" by 104" tablecloth
52" by 52" tablecloth

8. The outside edge of the following tablecloths were trimmed with a three-inch fringe. How much fringe was needed for each tablecloth? for 144 tablecloths in each size? What is the total length of fringe needed for all 432 tablecloths? (Give your answers in inches and in feet.)

   a. 64" by 84"
   b. 72" by 90"
   c. 72" by 108"

9. If it takes 96 sq. yards of linoleum to cover a hallway 24 yards long, how wide is the hallway?

10. What is the cost per square foot of floor space if 12,000 square feet cost $750,000?

11. A department store is re-covering all its 3 floors with hardwood. If the store is 24 feet long and 90 feet wide, what will be the cost at $78 per 1,000 square feet?

UNIT VII - GEOMETRIC FORMS

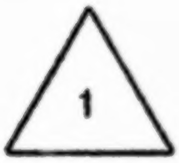
Triangles **Lesson No. 5**

OBJECTIVE: To learn about the types of triangles and how to find the area of triangles.

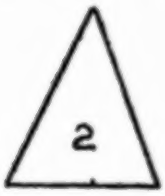
RELATED INFORMATION:

A triangle is a plane figure having three sides and three angles. Although they may be of various shapes, the area of any triangle equals one half the product of the base (the side on which the triangle appears to be standing) by the altitude or the vertical height, which is the same as saying one half the base times the height.

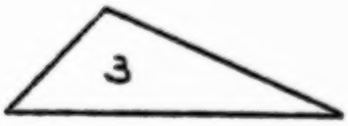
There are four types of triangles that we should learn to identify:



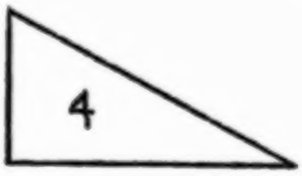
1. An equilateral triangle is one in which all sides are equal and all angles are equal.



2. An isosceles triangle is one in which two sides are equal and two angles are equal.



3. A scalene triangle is one in which none of the sides or angles are equal.

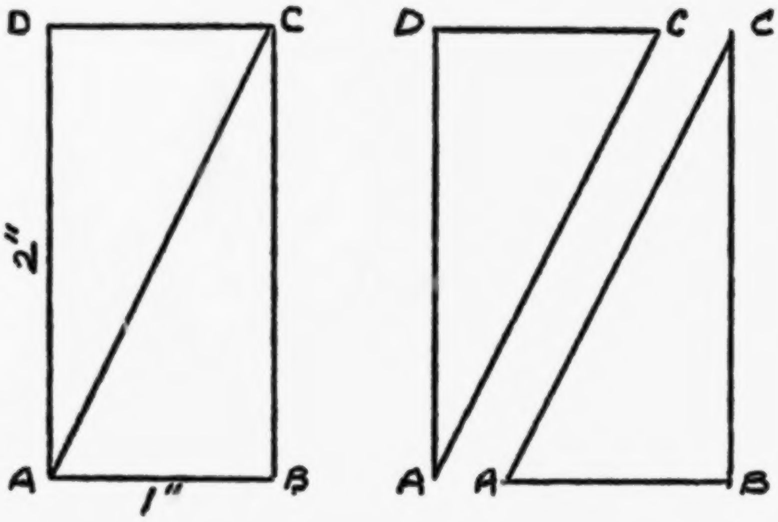


4. A right triangle is one which has one right angle. Could a right triangle also be equilateral? Isosceles? Scalene?

PROCEDURE:

The area of each of these triangles is equal to one-half the product of the base and altitude. $A = \frac{bh}{2}$

To show that this rule is true, cut out of paper a rectangle, as shown in the following drawings:



After drawing the diagonal as indicated, cut along it, cutting each piece into two triangular parts as shown. Check them against each other to see that they are identical in shape and size. Each one of these triangles, therefore, equals one half the whole area of the figure of which it is a part. Since the area of the rectangle equals the length (base) multiplied by the width (vertical height), then the area of each triangle would accordingly equal one half the base multiplied by the vertical height. Prove this by finding the area of the rectangle ABCD; of the triangle ABC.

Since the area of a triangle is equal to one half the product of the base multiplied by the height, the height may be found by dividing the area by one half the base; and the base may be found by dividing the area by one half the height.

Example: The area of a triangle is 48 square inches. If its base is 16", find the height.

$$h = \frac{A}{\frac{1}{2}b} = A \div \tfrac{1}{2}b$$

Therefore, $48 \div 8 = 6$ inches is the height.

Example: The area of a triangle is 108 sq. ft. Its height is 18 ft. Find the base.

$$b = \frac{A}{\frac{1}{2}h} = A \div \tfrac{1}{2}h$$

$108 \div 9 = 12$ feet in the base.

ASSIGNMENT:

1. Find the area of a triangle whose dimensions are as follows:

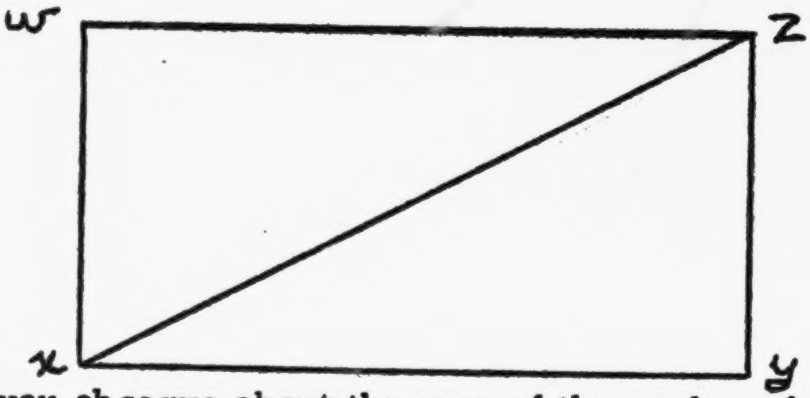
a.	Base 13",	height 12"
b.	Base 8 ft.,	height 4 ft.
c.	Base 6 yds.,	height 8 ft.

2. Find the missing part in each of the following:

	Area of Triangle	Base	Height
a.	64 sq. in.	16"	?
b.	72 sq. ft.	?	12 ft.
c.	108 sq. ft.	8 yds.	
d.		14 yds.	16 yds.
e.	88 sq. ft.	22 sq. ft.	

3. A dress has 2 triangular pockets that measure 6" at the base and $5\frac{1}{2}$" in height. What is the area of one pocket? two pockets If sequins are set on the pockets $\frac{1}{4}$" apart, how many sequins must be purchased for the two pockets?

4. With your protractor measure the angles formed in the rectangle WXYZ.



What do you observe about the sum of the angles of a rectangle? How many degrees are there in the sum of the angles of △XYZ? Of △XWZ? Do you see that the sum of the angles of these two triangles is the sum of all four angles of the rectangle?

5. Find the third angle of a triangle if two of its angles are:

a.	40° and 65°?	c.	18° and 76°?
b.	43° and 47°?		

6. What is the area of △ XYZ in problem 4 if XY is 3" and YZ is 6"?

UNIT VII - GEOMETRIC FORMS

Area of a Circle

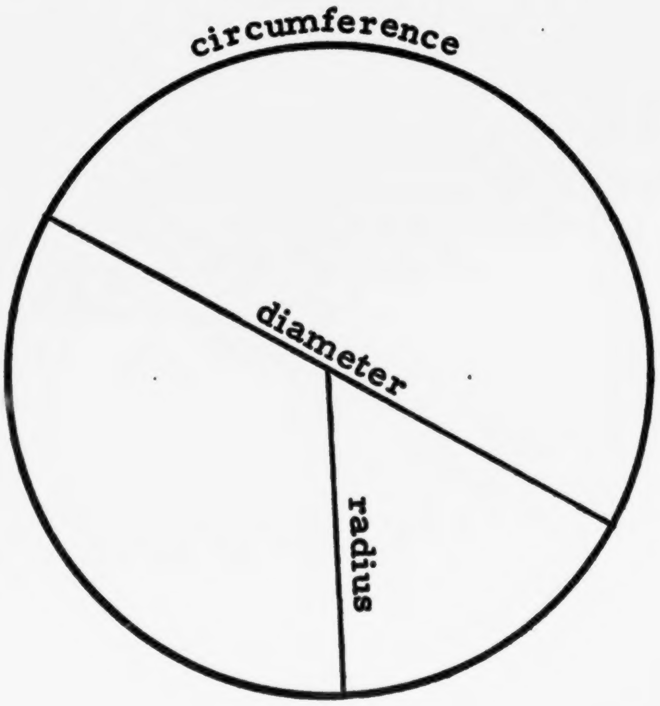
Lesson No. 6

OBJECTIVE: To learn how to measure the parts of a circle and how to find the area of a circle.

RELATED INFORMATION:

A circle is a plane surface bounded by a single curved line called its circumference. All points of a circle are equally distant from the center. The diameter is a line which passes through the center of the circle and divides the circle into halves. The radius is equal to $\frac{1}{2}$ the diameter; it is the distance from any point on the circumference to the center of the circle.

PROCEDURE:



Observe the circle at the left. Using a piece of string or thread, measure its circumference. Measure its diameter and radius. How does the length of the radius compare with the length of the diameter?

By actual measurement it can be found that the circumference of a circle is always 3. 1416 times the diameter. This ratio of the circumference of a circle to its diameter (3. 1416) has been given the Greek name pi, which is the Greek letter p, and is written π.

The circumference of a circle is, therefore, equal to π times the diameter.

The area of a circle is equal to π times r^2 (which means 3. 1416 x radius x radius).

Since 3. 1416 is very nearly $3\frac{1}{7}$, hence, unless an exact measure is required, we usually use $3\frac{1}{7}$ instead of 3. 1416.

When a number is multiplied by itself, it is said to be squared or raised to the second power. This is usually indicated by placing a small 2 just above and to the right of the number. For example, 3 x 3 may be expressed 3^2. This is read as three squared or the square of 3. In the same manner, radius x radius becomes radius^2.

Radius may be abbreviated as rad., R, or r.

Diameter may be abbreviated as diam., D, or d.

Circumference may be abbreviated as circum., cir., or C.

The rule for the area of a circle is usually expressed in abbreviated form as: $A = \pi r^2$

Example A: Find the circumference of a circle when the diameter is given.

We have seen that the circumference of a circle is π times the diameter. This is conveniently expressed as:

$$C = \pi d, \text{ which means } C = 3\tfrac{1}{7} \times \text{diameter.}$$

For example: Find the circumference of a circle whose diameter is 14 feet.

Solution: $3\frac{1}{7} \times 14 = 44$ feet.

Example B: Find the diameter of a circle when the circumference is given.

Since the circumference of a circle is equal to the diameter multiplied by π, the diameter may be found by dividing the circumference by π. That is $\frac{C}{\pi} = d$, which means $\frac{\text{circumference}}{3\frac{1}{7}} = \text{diameter}$

ASSIGNMENT:

1. **Find the area of a circle that is 28" in diameter.**
2. **Find the diameter of a circle whose circumference is 44".**
3. **Find the circumference of a circle whose diameter is 66 ft.**
4. **Find the missing valuesin each of the following:**

	Circumference	**Diameter**	**Radius**
a.	**88 inches**	**?**	**?**
b.	**?**	**35 ft.**	**?**
c.	**?**	**?**	**21"**
d.	**?**	**10' 6"**	**?**
e.	**154 ft.**	**?**	**?**
f.	**?**	**28 ft.**	**?**

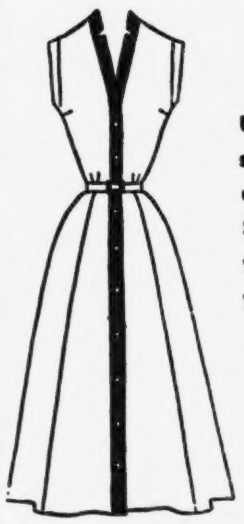
5. **Find the areas of circles whose diameters are:**

   a. 56" b. 70' c. 14 yds.

6. **Find the areas of circles whose radii are:**

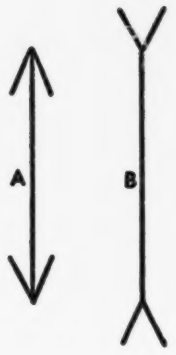
   a. 7 inches b. 12 feet c. 3 yards

Flatter your Figure

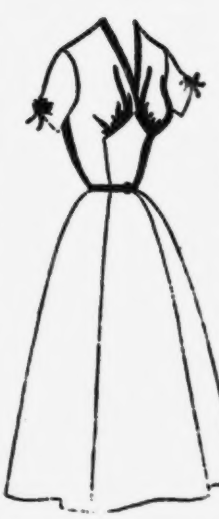


Use vertical lines so the eye moves up and down. Self color belts will be best for your figure.

Look Taller

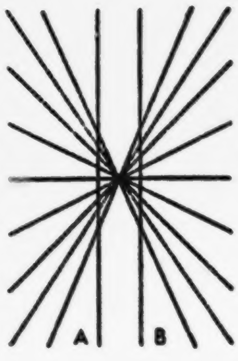


Both of these lines are the same length but doesn't B appear to be somewhat longer than A?

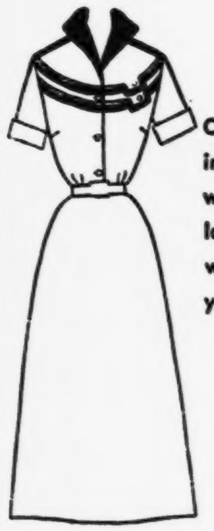


Use shirring to enhance your bosom. Soft cowl drapes, bows and pockets are also very helpful.

Enhance Your Bosom

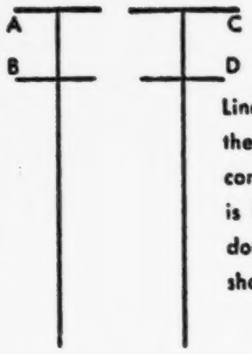


The vertical lines A and B are parallel, but don't they appear to bulge in the middle?

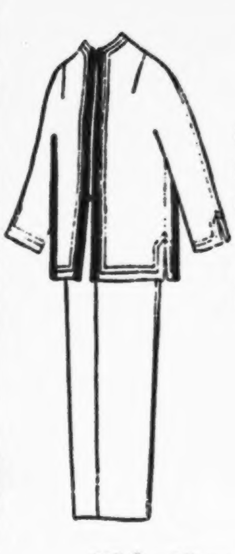


Concentrate all interest above the waistline. Yokes, wide lapels and pockets will broaden your shoulders.

Taper Your Hips

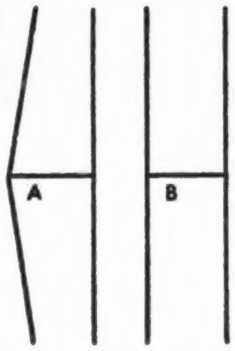


Lines B and D are the same but in contrast to C which is longer than A doesn't D seem shorter than line B?

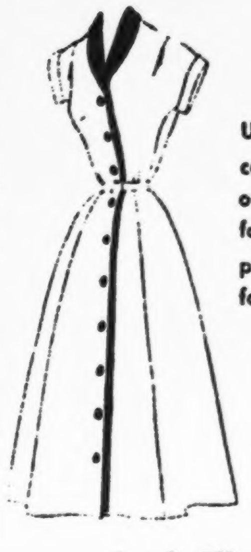


Straighten your silhouette with unbelted two piece dresses and box jacket suits. "Easy fit" is your rule.

Hide Your Middle

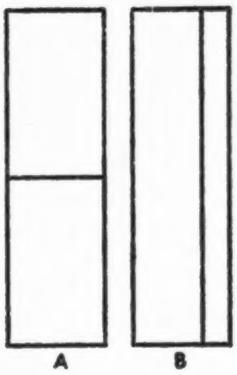


The horizontal lines are the same length but doesn't line A seem to be a bit longer than B?

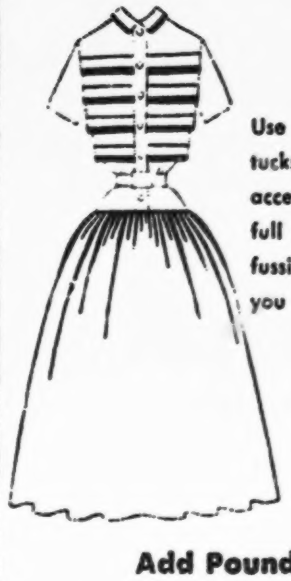


Use vertical lines, centered or at one side. Dull surfaced fabrics and plain sleeves are for you.

Look Slimmer

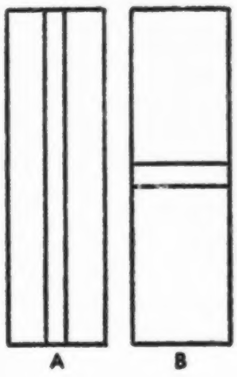


These oblong diagrams are the same size but doesn't B appear to be longer and slimmer than A?



Use horizontal tucks, shoulder accents, wide belts, full sleeves. No fussiness unless you are the type.

Add Pounds



These diagrams are the same size but doesn't the area of B look larger than the area of A?

Application of Geometric Forms to Patternmaking and Fashion Accessories

Lesson No. 7

OBJECTIVE: To gain a clearer understanding of the application of geometric forms in the needle trades.

RELATED INFORMATION:

In the creation of a garment, it is important to study the design and determine what direction the lines of the garment will have. It is the direction of the line, whether it is vertical or horizontal, straight or curved, etc., that will determine whether or not the garment will enhance the figure.

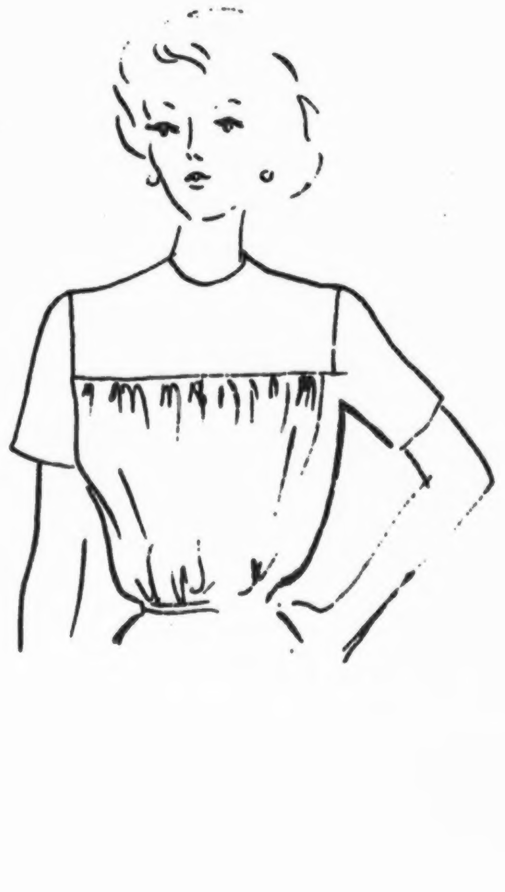
Seam lines are not the only lines that affect the way a garment looks. Other lines such as darts, tucks, pleats, and folds of fabric in the garment--folds that result from gathers, unpressed pleats, or draping-- also affect the overall design. Pockets, a conspicuous belt, trimmings of lace, ruching, or rickrack, even the outline of the silhouette are lines that determine the style of a garment.

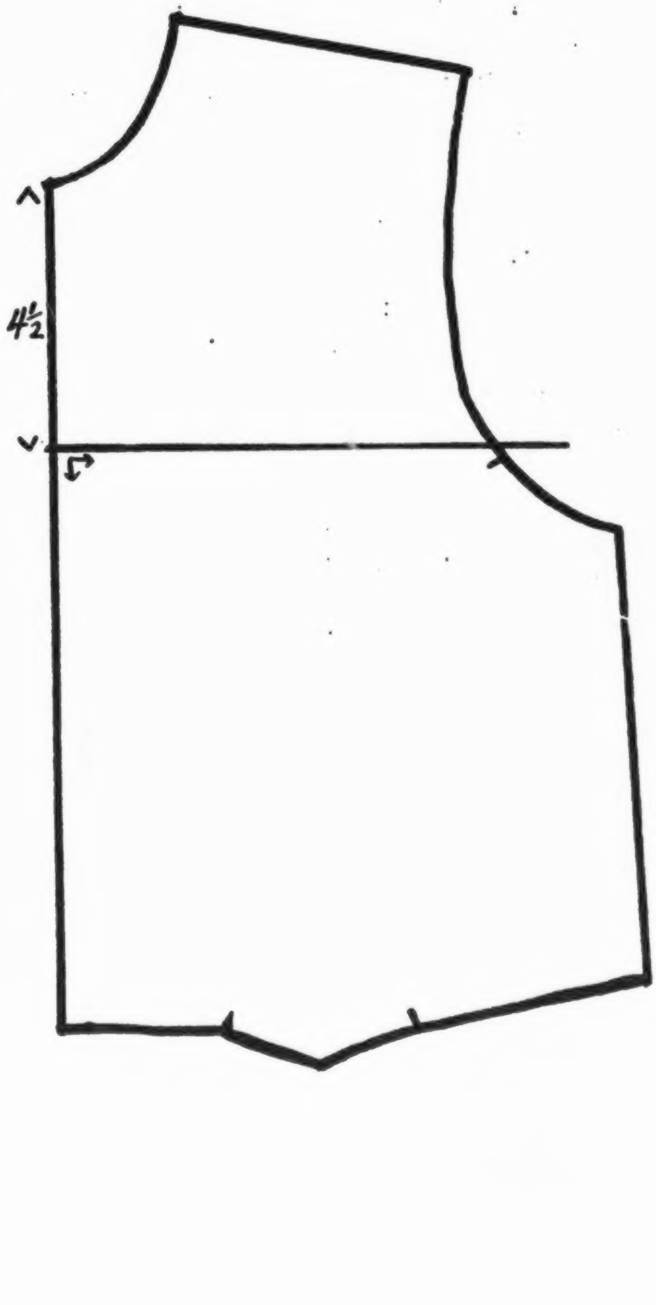
A tool that is frequently used to form angles is the square rule, whose shape is a right angle.

PROCEDURE:

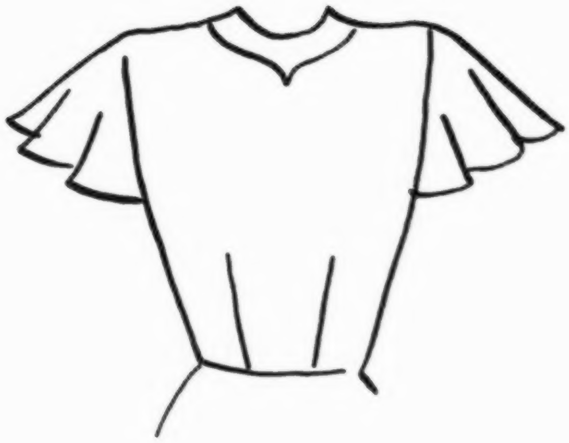
Example A: In the making of the yoke pattern, as shown in this blouse, it is necessary to understand the principle of forming a right angle.

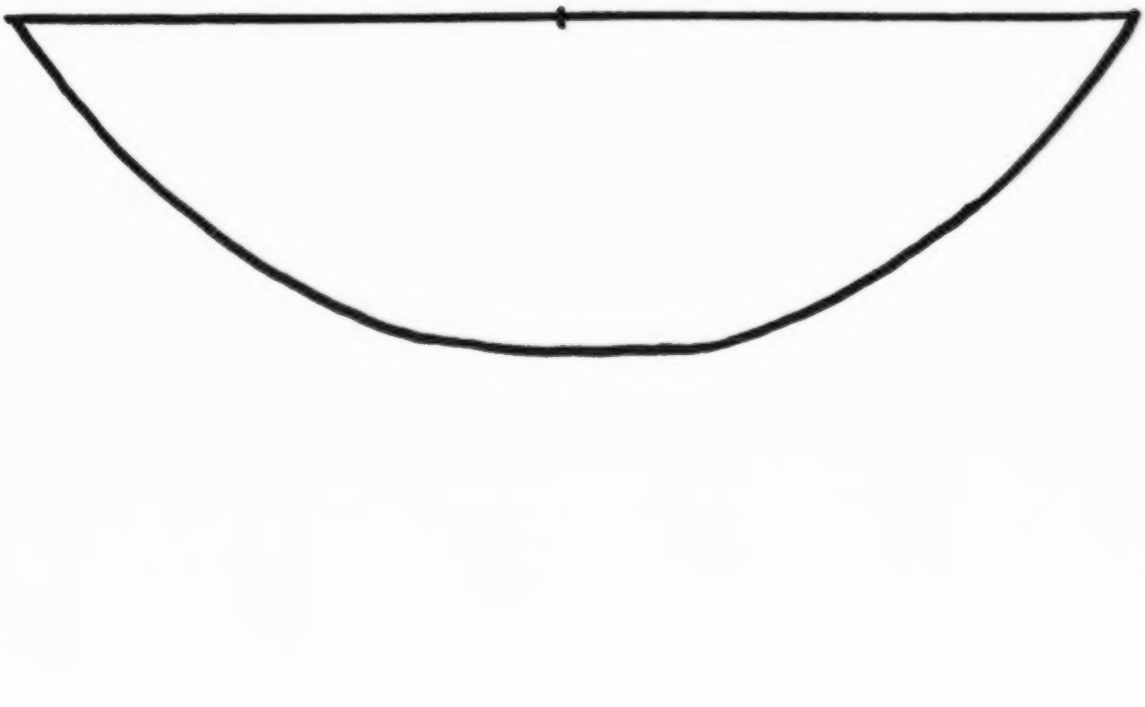
By using a square rule placed on the center front line, at the desired distance from the center front neckline, a line was drawn across the front of the sloper pattern that was perpendicular to the center front line. These two lines form a right angle where they meet.





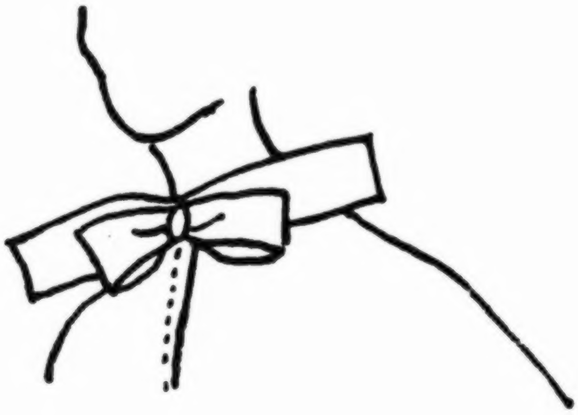
Example B: In the making of a cape sleeve, the amount of flare desired determines the curve of the circular shape needed. The following diagram shows a cape sleeve with exaggerated fullness. The straight line of this pattern represents the chord of a circle.

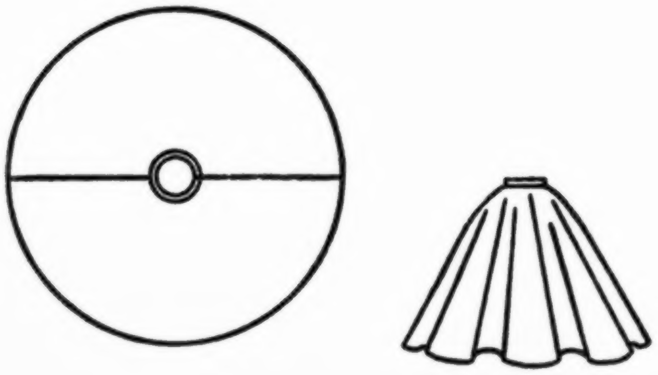




ASSIGNMENT:

1. A pique rectangle makes a bow at the neckline of a basic dress. The pattern measures two inches wide and 28 inches long. What is its area? The bows are to be cut along the length of the fabric. How much 36" pique would be needed to make bows for 140 dresses? (Draw a sketch.)

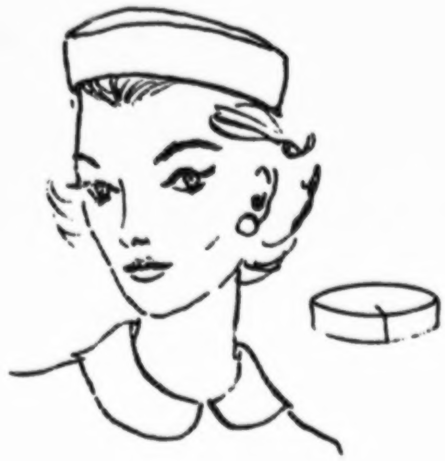




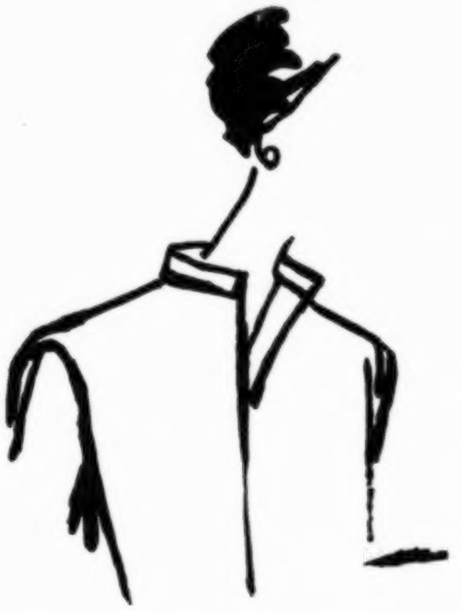
2. A circle is the basis for a circular skirt. How much novelty braid would be needed to trim the bottom edge of the skirt if the diameter of the circle is 54 inches? How much for 60 skirts?

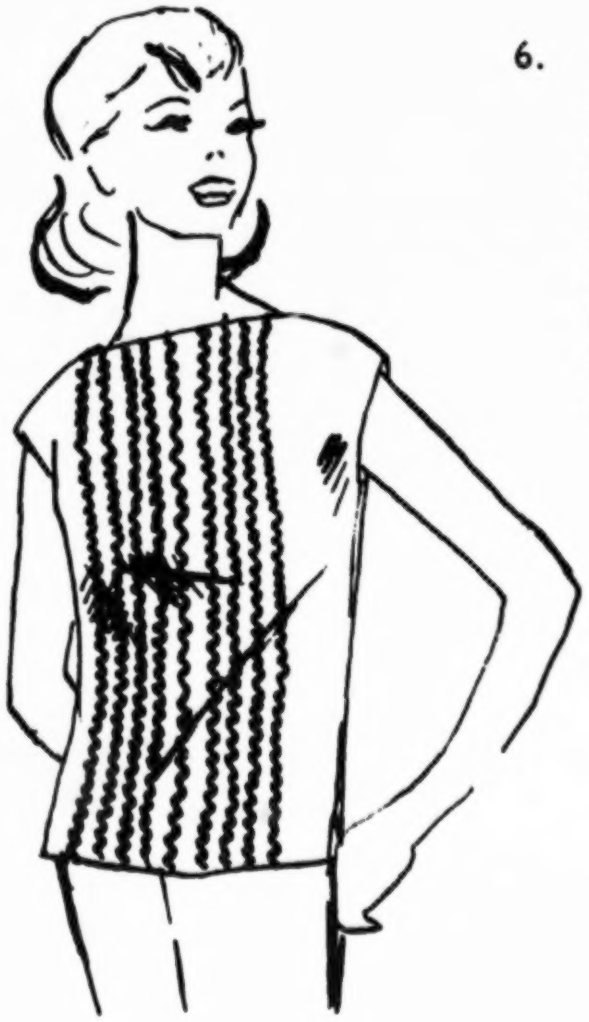
3. What is the area of the largest circle that can be cut from a square piece of fabric 36" on one side? What is the total number of square inches remaining in the pieces that fall out? Express both answers to the nearest tenth of a square inch.

4. This pill-box hat is made from a circle whose diameter is $7\frac{1}{4}$ inches including seam allowances. The side band measures $1\frac{3}{4}$ inches including seam allowances. How much material is needed for two dozen pill-box hats?

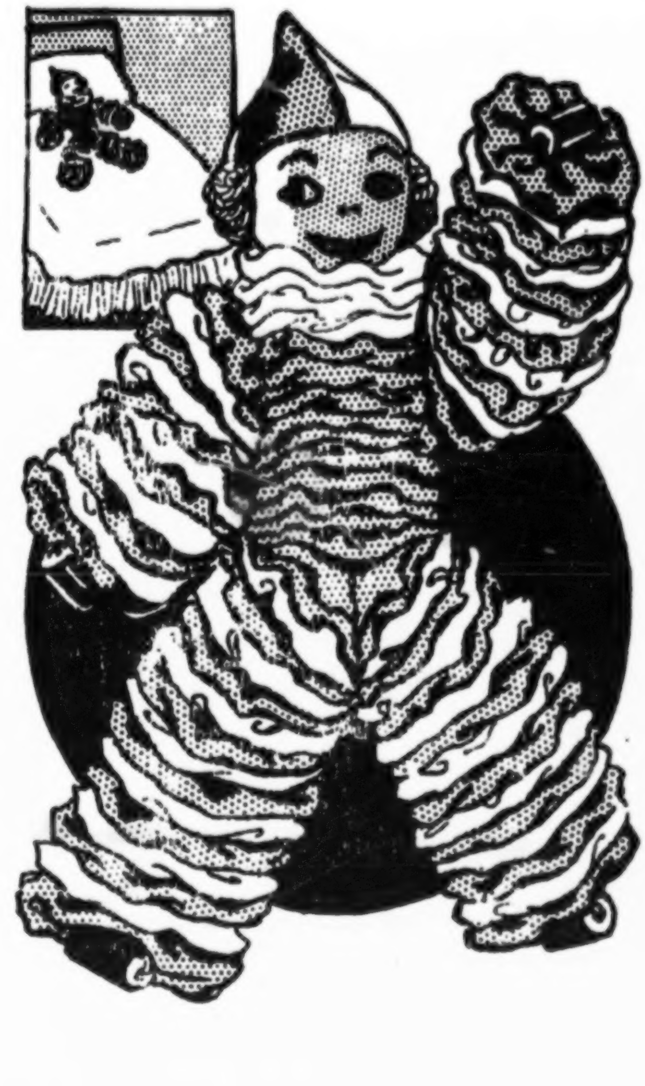


5. **This black basic dress was trimmed with a collar-band of satin. It measures $3\frac{1}{2}$ inches wide and 15 inches long, seams included. What is its surface area? What is the total area needed for 130 dresses? These are to be cut along the length of the fabric. How many yards of 39" material would be needed?**





6. **The rickrack used on this blouse is running vertically. How many yards would be needed for one blouse if the length of the blouse is 22" (hem included) and there are 9 rows of rickrack? How many yards for 132 blouses? What would be the total cost of the trimming if rickrack is .025¢ a yard?**



7. **In the making of this clown doll, a total of 79 circles $5\frac{3}{4}$" in diameter, are used. What is the total area of the circles? If $1\frac{1}{4}$ yards of 36" material is needed for 79 circles, how many square inches of material are wasted?**

UNIT VIII - ACCOUNTS

The Fundamental Elements of Keeping Accounts **Lesson No. 1**

OBJECTIVES: To learn the importance of complete financial records for a successful business.
To learn to figure proprietorship in a business.

RELATED INFORMATION:

The success or failure of a business depends upon the management of the business. The object of bookkeeping is to record business transactions in a systematic manner so as to provide information which will aid in the management of a business.

A small business does not need elaborate records but should have simple, useful accounting records. Little time is required in keeping simple records but any successful small-business man must be kept posted on the condition of his business. Bad use of accounting controls is one reason so many small businesses fail.

Much of the success of a business depends on knowing what its assets and liabilities are at all times.

PROCEDURE:

The following terms are important in the understanding of record keeping.

Assets - resources of a business consisting of such items as cash, property, merchandise, fixtures, supplies, machinery, etc.

Liabilities - claims of creditors against the assets of the business.

Proprietorship - the interest of the owner of a business enterprise in the assets.

Account - a record of the debits and credits relating to property, persons, profits or losses, collected under an appropriate title.

The balance of an account - the difference between the debits and credits.

Books of Original Entry - the blank books in which the transactions are recorded as they occur; such as the Cash Book, Sales Book, etc.

The Ledger - contains the names of the accounts to which are transferred (or posted) all the debits and credits from the books of original entry.

Merchandise Inventory - the value of goods in stock at the close of a fiscal year.

Fiscal Period or business period - the time between statements; it may be from one month in length to one year.

Trial Balance - a list of the accounts in the ledger usually made monthly to test the accuracy of the posting.

Balance Sheet - a statement of assets, liabilities, and proprietorship made at the end of each fiscal period.

Profit and Loss Statement - a report of profits and losses for the fiscal period which shows the results of the operations for the period.

Accounts Receivable - accounts kept for record of sales of goods to customers on credit.

Accounts Payable - record of things purchased from creditors.

In this lesson we will cover one of the above mentioned terms:

A. Finding proprietorship

Let us assume that Mary Smith owns the following assets and has no liabilities: cash, $4000; merchandise, $3,200; accounts receivable (claims against customers), $750; office furniture, $450. A statement of the assets owned and her resulting proprietorship might be prepared as follows:

Assets

Cash	$4,000.00
Merchandise	3,200.00
Accounts Receivable	750.00
Office Furniture	450.00
Mary Smith, proprietorship	$8,400.00

Since the total value of the assets must equal the proprietorshop, we have the first fundamental equation:

Assets = proprietorship

B. Finding proprietorship when there are outstanding debts

It will rarely happen that the proprietor of a business will own the assets free from all debts. The rights in the assets must be divided between the proprietor and those who have claims against the assets. Let us assume that Mary Smith has the same assets listed above but owes $850 for merchandise purchased. This statement would be prepared as follows:

Assets

Cash	$4,000.00	
Merchandise	3,200.00	
Accounts Receivable	750.00	
Office Furniture	450.00	
Total Assets		$8,400.00

Liabilities

Accounts Payable (due to creditors)	850.00
Mary Smith, proprietorship	$7,550.00
	$8,400.00

The above statement employs the complete fundamental equation, which is:

Proprietorship = Assets - liabilities

ASSIGNMENT:

1. On June 1, 19__, Ethel Jones owned $1400 in cash and a stock of merchandise worth $1,750. What was Miss Jones' proprietorship in her business? Prepare a simple statement to show this.

2. On January 1, 19__, B. A. Dawson owned: cash, $325, merchandise inventory, $1250; furniture, $250; accounts receivable, $103.40; his liabilities were: notes payable $350; accounts payable, $224.80. What is Dawson's proprietorship? Prepare a simple statement to show this.

3. The assets of The Woodbridge Dress Shop on November 1, 19__, are $6,000.00 and the liabilities are $2,000; three months later the assets are $7,500 and the liabilities are $2,500. What change has taken place in proprietorship during the three months?

4. On July 1, 19__, Jane Smith owned $2650.25 in cash and merchandise worth $1975.50. Customers owed her $1,123 and she had furniture and fixtures worth $300. She owed creditors $935. Prepare a statement that will show the proprietorship of the owner.

5. If Miss Smith began the business mentioned in problem 4 above with a cash investment of $3,975 on May 1, what has happened to her proprietorship during the two months?

6. On October 1, 19__, Grace Keenan has the following assets and liabilities:

Cash	$2,875.25
Merchandise	1,890.00
Amounts due to creditors	1,025.00
Amounts due from customers	965.00
Furniture and fixtures	200.00
Delivery truck	2,050.00
Office supplies	45.00

Prepare a statement that will show the proprietorship of the owner.

7. How would you determine the proprietorship of the owner of a business?

8. A dressmaker tells you that she has "made money" during the past year. She has kept no records. What do you think makes her believe this? Might she be mistaken?

OBJECTIVE: To learn the proper procedure for adequate control of cash received and cash disbursed.

RELATED INFORMATION:

In a modern business office it is very important to arrange details so that the large number of business transactions may be recorded efficiently and quickly. Since so many business transactions involve the receipt or payment of cash, a separate journal in which to record only cash receipts and cash disbursements (payments) is used in most businesses to save time and work in recording cash transactions. The receipts and disbursements occupy opposite pages, the receipts on the left and the payments on the right. This will make it easy to compare them.

PROCEDURE:

In using a cash journal or cashbook, such as is illustrated on the following pages, all cash receipts are recorded on the left side of the cash journal and all cash payments are entered on the right side of the cash journal. The cash receipts book can be divided into the necessary columns, such as: Cash, Sales Discount, Accounts Receivable, Sundry, Name of Bank.

The cash payment book can be divided into the necessary columns, such as: Cash, Purchase Discount, Accounts Payable, and Sundry.

It is customary to balance the cash journal at the end of each month. A careful study of the illustration of the cash journal shows that, in balancing the journal, the horizontal rulings match across the two pages and that the final totals are in alignment.

Cash Receipts

19—			Cash	Sales Disc.	Accts. Rec.	Deposits
April	1	Bal. Brt. Fwd.	4911 09			
	2	Dickson + Ives	9 40	78	10 18	
		Style + Gift Shop	9 72	78	10 50	
		Style Shop	9 20	55	9 75	28 32
	9	Miss L. Friedman	15 00	2 75	17 75	
		Elsie Goupil	100 22	49	100 71	
		Ames + Brownley	92 73	8 02	100 75	
		Beau Monde	112 26	9 74	122 00	
		Bohon Co.	237 72	18 78	256 50	
		Conklin Style Shop	63 97	5 58	69 55	
		Sport Shop	120 13	10 32	130 45	742 03
	15	Gladys Bunting	54 60	4 68	59 28	
		Montaldo's	240 90	20 90	261 80	
		Frances Slater	35 90	3 06	38 96	
		Jones + Co.	91 08	7 92	99 00	422 48
	18	Mary Brown.	73 23	6 04	79 27	
		Conner's	54 77	4 76	59 53	
		Mildred's	91 09	7 66	98 75	
		Mary's Dress	54 28	4 72	59 00	273 37
	25	Claire Andrews	190 85		190 85	
		Ruth's	175 84	15 41	191 25	
		Mary Rice	47 60	4 15	51 75	414 29
	29	Montaldo's	45 31	3 94	49 25	
		Yrene	38 54	1 58	40 12	83 85
		Totals	6875 43	142 61	2106 95	1964 34
May	1	Balance Brt forward	3119 40			

Cash Payments

19— April			Ck#	Cash	Purchase Disc.	Accts Pay.	Sundry
	7	Hemingway Bros.	1037	2 88		2 88	
	10	Robert Strauss Sales	1038	193 60			193 60
		Womens Wear Daily	1039	28 45		28 45	
		Gelfman Bros	1040	44 77	91	45 68	
		A. Hertz Co.	1041	13 23	27	13 50	
		L. Elmer	1042	25 94	26	26 20	
		Ardon Belt Co.	1043	89 53	1 83	91 36	
	14	Amari Textiles	1044	715 69	3 41	719 10	
	18	Madison Offset	1045	8 24		8 24	
		Robert Strauss Sales	1046	300 00			300 00
		Gotham Container	1047	8 12		8 12	
	23	Collector Int. Revenue	1048	56 40			56 40
		I. Goldstein Account.	1049	25 00		25 00	
	28	Railway Express	1050	1 61		1 61	
		Amari Textiles	1051	752 44	15 35	767 79	
		Payroll	1052	1380 83			1380 83
		Modern Pleating	1053	34 11	69	34 80	
		Seely Shoulder Pad	1054	75 19	6 35	81 54	
		Totals		3756 03	29 07	1854 27	1930 83
	30	Balance		3119 40			
				6875 43			

ASSIGNMENT:

1. Rule up a form for a cash receipts journal and record the following:

Oct. 1, 19__, Ruth Bien invested $4000 cash in her dress business.

4. Received $250 cash from Frances Paine to apply on account.

4. Received cash $500, from Anna Smith for her note due today.

4. Fran Smith paid her account in full, $394. 50.

21. Grace Kean paid cash for invoice of October 1, $925. 50.

26. Received cash $155. 75 from Ethel Green for merchandise received.

31. Received cash from Helen Elliot for invoice of October 11, $450.

Rule and close the cash receipts journal.

2. Use a cash payments journal and record the following transactions:

May 1, 19__, Paid cash for office supplies, $18. 00, check #101.

8. Paid R. Hollins in full $362. 80, check #102.

12. Paid Helen Crawford for her invoice of May 5, $488. 25, check #103.

17. Paid note due today in favor of Matthew Hinds, $500, check #104.

24. Helen Bjerken, proprietor, withdrew cash for personal use, $50, check #105.

30. Paid Helen Crawford for invoice of May 22, $471. 80, check #106.

Rule and close the cash disbursements journal.

3. Use a double sheet of journal paper and write up the cashbook for the following:

June 1, 19__, Edna Adams began business with a cash investment of $4,500.

2. Paid F. C. Elliot, landlord, rent for June, $175.

4. Sold a lot of merchandise for cash, $125.

6. Paid $20 cash for office supplies.

9. Received cash from Joan Bane on account, $390.

11. Frank Lane paid his 10-day note due today, $450.

14. Paid office salaries in cash, $150.

15. Mrs. Adams withdrew $100 cash for personal use.

Close and balance the cashbook. Bring down the balance.

4. Write up the cashbook for the following:

Sept. 1, 19__, Balance $3,250.

2. Received cash from S. E. Leslie for invoices of Aug. 22, $923.75.

3. Purchased a typewriter for cash, $115.

5. Paid R. C. Cummings for his invoice of Aug. 26, $532.50.

6. Received cash, $750, from E. Lane for his note due today.

10. Paid freight on merchandise purchased, $17.50.

20. Betty Fordson paid her account in full, $825.

30. W. F. Wood paid cash, $566.75, for invoice of Aug. 10.

31. Paid salaries for the month, $510.

Close and balance the cashbook. Bring down the balance.

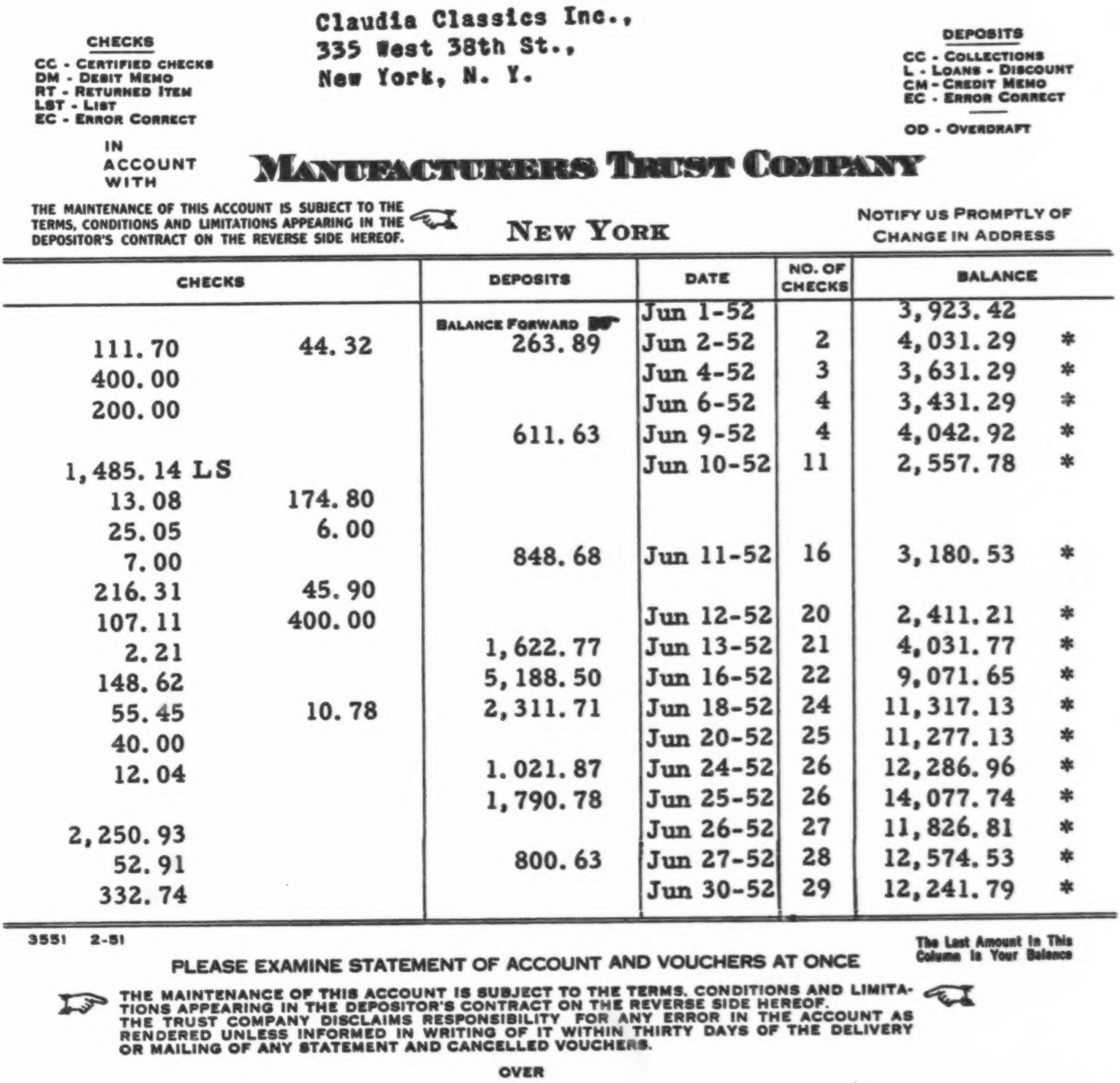
Reconciliation of Bank Balance

Lesson No. 3

OBJECTIVE: To learn how to prepare a bank reconciliation statement.

RELATED INFORMATION:

At the end of each month, banks send out a monthly statement to each depositor. The following is an illustration of a statement of account form used by banks:



CHECKS
CC - CERTIFIED CHECKS
DM - DEBIT MEMO
RT - RETURNED ITEM
LST - LIST
EC - ERROR CORRECT

Claudia Classics Inc.,
335 West 38th St.,
New York, N. Y.

DEPOSITS
CC - COLLECTIONS
L - LOANS - DISCOUNT
CM - CREDIT MEMO
EC - ERROR CORRECT

OD - OVERDRAFT

IN
ACCOUNT
WITH

MANUFACTURERS TRUST COMPANY

NEW YORK

THE MAINTENANCE OF THIS ACCOUNT IS SUBJECT TO THE TERMS, CONDITIONS AND LIMITATIONS APPEARING IN THE DEPOSITOR'S CONTRACT ON THE REVERSE SIDE HEREOF.

NOTIFY US PROMPTLY OF CHANGE IN ADDRESS

CHECKS		DEPOSITS	DATE	NO. OF CHECKS	BALANCE	
		BALANCE FORWARD	Jun 1-52		3,923.42	
111.70	44.32	263.89	Jun 2-52	2	4,031.29	*
400.00			Jun 4-52	3	3,631.29	*
200.00			Jun 6-52	4	3,431.29	*
		611.63	Jun 9-52	4	4,042.92	*
1,485.14 LS			Jun 10-52	11	2,557.78	*
13.08	174.80					
25.05	6.00					
7.00		848.68	Jun 11-52	16	3,180.53	*
216.31	45.90					
107.11	400.00		Jun 12-52	20	2,411.21	*
2.21		1,622.77	Jun 13-52	21	4,031.77	*
148.62		5,188.50	Jun 16-52	22	9,071.65	*
55.45	10.78	2,311.71	Jun 18-52	24	11,317.13	*
40.00			Jun 20-52	25	11,277.13	*
12.04		1.021.87	Jun 24-52	26	12,286.96	*
		1,790.78	Jun 25-52	26	14,077.74	*
2,250.93			Jun 26-52	27	11,826.81	*
52.91		800.63	Jun 27-52	28	12,574.53	*
332.74			Jun 30-52	29	12,241.79	*

3551 2-51

The Last Amount In This Column Is Your Balance

PLEASE EXAMINE STATEMENT OF ACCOUNT AND VOUCHERS AT ONCE

THE MAINTENANCE OF THIS ACCOUNT IS SUBJECT TO THE TERMS, CONDITIONS AND LIMITATIONS APPEARING IN THE DEPOSITOR'S CONTRACT ON THE REVERSE SIDE HEREOF. THE TRUST COMPANY DISCLAIMS RESPONSIBILITY FOR ANY ERROR IN THE ACCOUNT AS RENDERED UNLESS INFORMED IN WRITING OF IT WITHIN THIRTY DAYS OF THE DELIVERY OR MAILING OF ANY STATEMENT AND CANCELLED VOUCHERS.

OVER

This statement shows the balance at the beginning of the month, all deposits made during the month, all checks drawn and cleared by the bank during the month and the balance at the time the statement was made.

In any business, most payments are made by check and most customers pay by check. Many of these checks are sent to distant cities and often two or three weeks elapse before the checks are returned to the depositor's bank and charged to his account. As a result, the balance of cash in the bank rarely agrees with the balance shown in the depositor's checkbook or cashbook. Most of the difference is due to the fact that some of these checks had not been paid at the time the bank made up the statement. Such checks are called outstanding checks. The difference caused by the checks outstanding is accounted for by preparing in the check book, or elsewhere, a reconciliation statement.

PROCEDURE:

In the preparation of a reconciliation statement, checks outstanding may not be the only difference between the amount of the balance as shown in the check book and the balance shown on the bank statement. Items may appear on the depositor's books which have not yet been taken up on the bank's books, such as:

Deposits not yet received or recorded by the bank.

Items may appear on the bank's books which have not yet been taken up on the depositor's books, such as:

Service charges

Charges for checks returned N. S. F. (insufficient funds)

To reconcile the bank balance:

1. You must check all deposits listed on the statement with deposits entered in the check book or cash book.
2. You must check all checks charged to your account with checks drawn on your check book.

A bank reconciliation for the Brown Company for June 30, 19__ appears below:

Bank Reconciliation
June 30, 19__

Balance, per books			$3,625.97
Balance, per bank statement		$3,500.17	
Add deposit, not credited by bank		310.00	
Total		$3,810.17	
Deduct outstanding checks:			
#129	$100.00		
#130	84.20	184.20	
Adjusted balance		$3,625.97	$3,625.97

This reconciliation shows that $310 recorded by the company as a deposit in June had not been credited by the bank at the end of the month, and that checks for $100 and $84.20 were outstanding.

As the balance shown by the bank statement rarely agrees with the balance shown by the depositor's books, it is important to reconcile the bank statement as soon as possible after it has been received. Only in this way can errors be caught.

ASSIGNMENT:

1. Set up reconciliation statements for each of the following:

   A. January 1, 19__ the bank statement shows a balance of $2391.64. Checks not returned are #401 for $75, #403 for $101.60, #404 for $4.80, $405 for $1.25, and #406 for $17.66. The check book shows a balance of $2191.33.

   B. The check book shows a balance of $328.72. The bank statement shows a balance of $417.95. Three checks have not been returned: #76 for $32.95, #78 for $22.85, and #79 for $28.75. Interest item on loan for $4.68 has not been entered in check book. Prepare reconciliation statement.

C. On January 2, James Clark received from the bank his monthly bank statement, showing the bank's balance to be $3961.70. On comparing the report with the checks issued, it was found that the following checks had not been returned: #301 for $207.06, #304 for $58.23, and #305 for $437.10. The following items had not been recorded in the check book, but had been paid at the bank: $25, $30, and a note for $125.50. What balance should Clark's check book show?

D. On June 1, Joan Delman received her bank statement. Her check book balance is $1242.09. The following checks had not been returned by the bank: $40.20, $125.68, $75.50 and $286.90. Miss Delman neglected to enter on the check book stub the amount of one check for $50.60. She had also made an error by writing on the stub of one check $78.90 when it should have been entered as $87.90. What is the bank balance? Prepare a reconciliation statement.

E. According to the monthly bank statement, C. M. Rader's bank balance on October 31 was $2176.15. His check book balance was $1838.14 on the same date. By checking off the returned checks he found the following checks still outstanding: $215.20, $186.01, and $62.25. One check which Mr. Rader had deposited had been returned marked "no funds", and had been charged to his account, but no record of this charge had been made on his check book. What was the amount of the bad check? Reconcile the account.

F. The monthly bank statement received by Claudia Classics on April 1 listed a balance of $3594.55. The following checks had not been returned by the bank: #1072 for $81.03, #1074 for $277.32, #1076 for $1.61, and $1079 for $64.67. There was no record made of the deposit for May 31, for $165.25. The check book showed a balance of $3334.17. Prepare a reconciliation statement.

Wages Lesson No. 4

OBJECTIVE: To learn how to compute earnings on different time or piece rates.

To learn to check the amount of deductions from your pay.

RELATED INFORMATION:

Of the many sources of income, wages are the chief source to a large proportion of people. The wage-time of employees is generally figured by the hour or by the day. However, most operators, finishers, and pressers in the needle trades are paid by piecework. A certain price is paid for each piece of work. As the worker becomes skilled and is able to complete more pieces of work in a day, he earns more money per day.

It is important for you to know how to figure your earnings and also to figure the deductions from your pay. Some of the deductions made today are: Federal income tax, State unemployment insurance, social security, union dues, hospitalization insurance, savings bonds, etc.

The amount of money that you will make will depend upon many things, such as your ambition, attendance on the job, and application to your work.

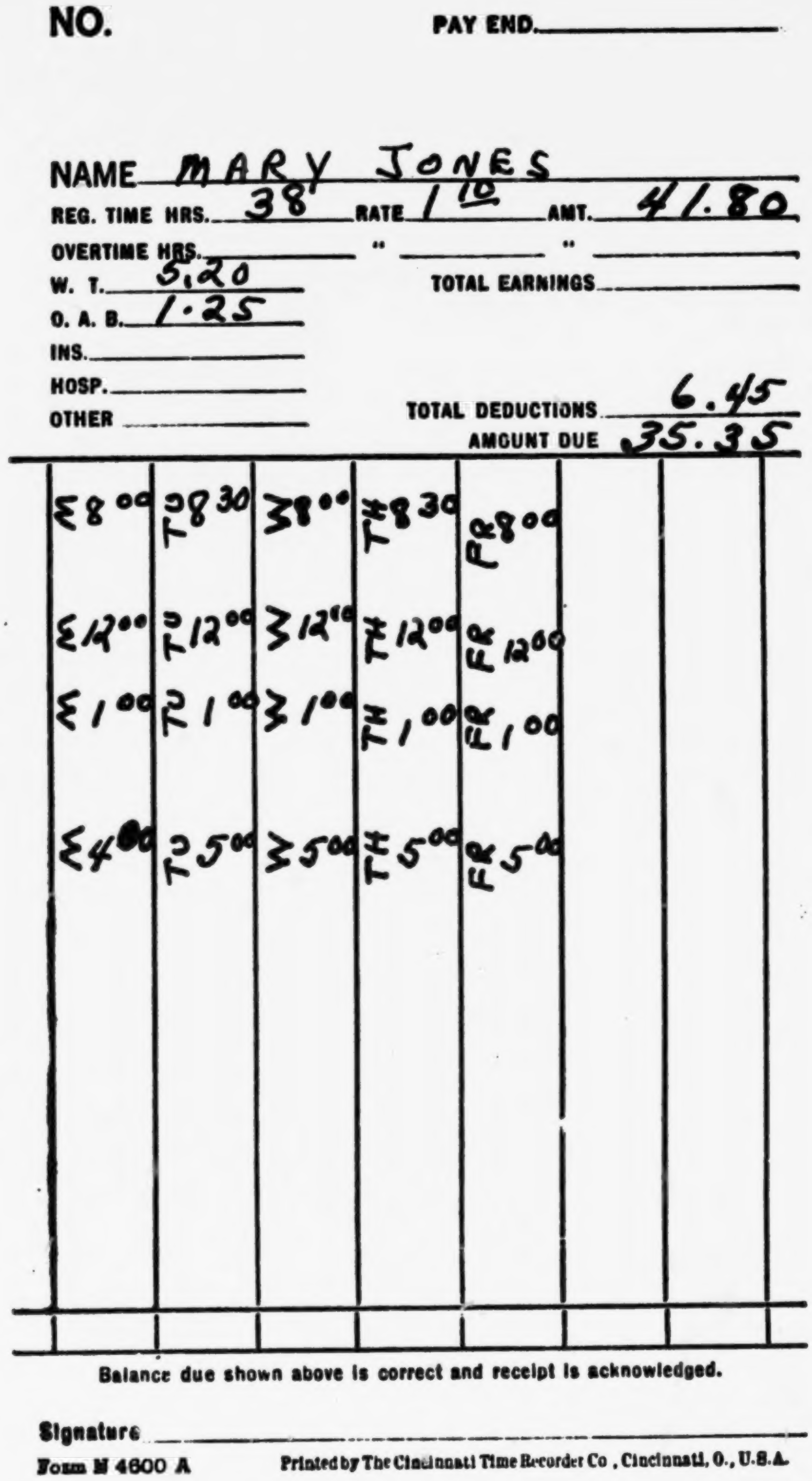
PROCEDURE:

A. Time Cards:

Many companies use a time clock which records the days and the hours each employee spends at work. Each employee has a time card, similar to the one pictured, with his or her name or number on it. These cards are kept in a rack next to the clock. Every time a worker reports for work, goes to lunch, returns from lunch and leaves at the end of the day, she will place her card in the time clock to record the time. As you can see, this keeps an accurate record of all the working time spent by each employee.

Your weekly earnings are determined by the time stamped on the time cards. Many companies make a rule to dock a worker (deduct some of his pay) if he arrives late. The worker may be docked as much as a half-hour's pay for lateness of from one to 30 minutes.

Example: You receive $1. 10 an hour for the time you work between 8:00 a.m. and 5:00 p.m. What are your wages for the time recorded on the card above?



NO. PAY END.

NAME MARY JONES
REG. TIME HRS. 38 RATE 1 10 AMT. 41.80
OVERTIME HRS. " "
W. T. 5.20
O. A. B. 1.25
INS.
HOSP.
OTHER
TOTAL EARNINGS
TOTAL DEDUCTIONS 6.45
AMOUNT DUE 35.35

M 8 00	T 8 30	W 8 00	TH 8 30	FR 8 00
M 12 00	T 12 00	W 12 00	TH 12 00	FR 12 00
M 1 00	T 1 00	W 1 00	TH 1 00	FR 1 00
M 4 00	T 5 00	W 5 00	TH 5 00	FR 5 00

Balance due shown above is correct and receipt is acknowledged.

Signature

Form N 4600 A Printed by The Cincinnati Time Recorder Co., Cincinnati, O., U.S.A.

Solution: The total working time was 38 hours x $1. 10, which equals $41. 80. On the basis of an eight-hour day and five days a week, you had a loss of $2. 20 because you were late two days and left early another day. What per cent of your possible earnings did you lose? (5%). You can see that the loss of time can also means the loss of money.

B. Piecework:

When you work piecework, the more work you do, the more money you earn. Some operators are paid for a complete garment, others are paid for doing just one operation on a garment. They are both paid by the piece, whether in single units or by the dozen.

Example: An operator received $1.40 for style #883, $1.10 for style #804, and $1.25 for style #801. During the week of July 28th she made the following:

22 dresses of style #883 @	$1.40	=	$30.80
27 dresses of style #801 @	1.25	=	33.75
5 dresses of style #804 @	1.10	=	5.50
Total earnings		=	$70.05

C. Deductions withheld from employee's wages:

An individual record, as shown on the following page, should be kept for each employee, showing for each payroll period during the year: hours worked, gross earnings, and the amount of each deduction. There are certain deductions authorized by the government to be taken from your wages. These deductions are summarized as follows:

1. Employee's share of F. I. C. A. taxes. (Federal Insurance Contribution Act, which covers old age benefits and social security). The rate charged is 3% of the first $4,800 of employee's wages (1960).

2. Employee's share of S. U. C. & T. D. B. (State Unemployment Compensation and Temporary Disability Benefits) taxes. The rate charged is $\frac{3}{4}$% of earnings up to and including $3,000.

3. Income taxes withheld

   The amount withheld is affected by a number of factors, such as the length of the pay period, the amount of the pay, and the number of dependents claimed by the employee. On pages 208 and 209 is a weekly withholding tax chart.

4. Other deductions such as: hospitalization insurance, union dues, savings plans, and government bonds are more or less voluntary.

EMPLOYEE'S RECORD

YEARLY RECAPITULATION BY QUARTERS

QT'R	EARNINGS	F.O.A.	W'H'LD'G	SUIF	DUES	TOT. DED.	NET PAID
1ST	910 00	20.46	136 50	6.85	9.00	172 81	737 19
2ND	826 00	18.60	121 10	6.20	9.00	154 90	671 10
3RD	1019 60	22.97	150 30	7.62	9.00	189 89	829 71
4TH	956 80	21.53	140 40	1.58	9.00	172 51	784 29
TOTAL	3712 40	83.56	548 30	22.25	36.00	690 11	3022 29

NAME: John Jones EXEMPTIONS: 1
Address: 130 Smith St. Phone:
City: ELIZABETH., S.S. Acc't No: 147-18-5633
Position: Sex Single Married
Date Born: Where Born: Date Employed:
Clock No: Hrs. Per Day: 8 Per Week 40 Date Released:
Rate changes. Date: 10/29 $1.75 per hr.; Date: 7/20 $1.84 per hr.; Date: $ per

FIRST QUARTER – 19.........

PAYROLL PERIOD	REG. TIME		OVER-TIME		TOTAL EARNINGS	DEDUCTIONS				NET PAID
	TIME	AMT	TIME	AMT		FICA	W'HLDG	S.U.I.F	DUES	
12/29	40				70.00	1.57	10 50	.53	3.00	54 40
1/5	40				70.00	1.57	10 50	.53		57 40
1/12	40				70.00	1.58	10 50	.53		57 39
1/19	40				70.00	1.57	10 50	.52		57 41
1/26	40				70 00	1.57	10 50	.53		57 40
2/2	40				70 00	1.58	10 50	.53	3.00	54 39
2/9	40				70 00	1.57	10 50	.53		57 40
2/16	40				70 00	1.58	10 50	.52		57 40
2/23	40				70 00	1.57	10 50	.53		57 40
3/2	40				70.00	1.58	10 50	.52	3.00	54 40
3/9	40				70 00	1.57	10 50	.53		57 40
3/16	40				70 00	1.58	10 50	.52		57 40
3/23	40				70 00	1.57	10 50	.53		57 40
TOTAL 1ST QTR.					910 00	20.46	136 50	6.85	9.00	737 19

SECOND QUARTER – 19.........

PAYROLL PERIOD	REG. TIME		OVER-TIME		TOTAL EARNINGS	DEDUCTIONS				NET PAID
	TIME	AMT	TIME	AMT		F.O.A.	W'HLDG	SUIF	DUES	
3/30	40				70.00	1.58	10 50	.52		57 40
4/6	40				70.00	1.57	10 50	.53	3.00	54 40
4/13	40				70 00	1.58	10 50	.52		57 40
4/20	40				70 00	1.57	10 50	.53		57 40
4/27	32				56.00	1.26	7 90	.42		46 42
5/4	32				56 00	1.26	7 90	.42	3.00	43 42
5/11	40				70 00	1 58	10 50	.52		57 40
5/18	40				70 00	1.57	10 50	.53		57 40
5/25	40				70 00	1.58	10 50	.52		57 40
6/1	8				14 00	.32	30	.11	3.00	10 27
6/8	40				70 00	1.57	10 50	.53		57 40
6/15	40				70.00	1.58	10 50	.52		57 40
6/22	40				70.00	1.58	10 50	53		57 39
TOTAL 2ND QTR.					826 00	18 60	121 10	6.20	9.00	671 10
TOTAL 6 MOS.					1736 00	39.06	257.60	13.05	18.00	1408 29

THIRD QUARTER – 19.........

PAYROLL PERIOD	REG. TIME		OVER-TIME		TOTAL EARNINGS	DEDUCTIONS				NET PAID
	TIME	AMT	TIME	AMT		F.O.A.	W'HLDG	S.UIF	DUES	
6/29	40				70 00	1.57	10 50	.52		57 41
7/6	40				70 00	1.58	10 50	.53	3.00	54 39
7/13	40				70 00	1.57	10 50	.52		57 41
7/20	40				73 60	1.66	10 80	.55		60 59
7/27	40				73 60	1.66	10 80	.55		60 59
8/3	40				73 60	1.66	10 80	.55	3.00	57 59
8/10	40				73 60	1.66	10 80	.55		60 59
8/17	40				73 60	1.66	10 80	.55		60 59
8/24	40				73 60	1.66	10 80	.55		60 59
8/24	Vacation				147 20	3.31	21 60	1.10	3.00	118 19
8/31	40				73 60	1.66	10 80	.55		60 59
9/21	40				73 60	1.66	10 80	55		60 59
9/28	40				73 60	1.66	10 80	55		60 59
TOTAL 3RD QTR.					1019 60	22.97	150 30	7.62	9.00	829 71
TOTAL 9 MOS.					2755 60	62.03	407 90	20.67	27.00	2238 00

FOURTH QUARTER – 19.........

PAYROLL PERIOD	REG. TIME		OVER-TIME		TOTAL EARNINGS	DEDUCTIONS				NET PAID
	TIME	AMT	TIME	AMT		F.O.A	W'HLDG	SUIF	DUES	
10/5	40				73 60	1.66	10 80	.55	3.00	57 59
10/12	40				73 60	1.66	10 80	.55		60 59
10/19	40				73 60	1.66	10 80	.48		60 66
10/26	40				73 60	1.66	10 80			61 14
11/2	40				73 60	1.65	10 80		3.00	58 15
11/9	40				73 60	1.66	10 80			61 14
11/16	40				73 60	1.65	10 80			61 15
11/23	40				73 60	1.66	10 80			61 14
11/30	40				73 60	1.65	10 80			61 15
12/7	40				73 60	1.66	10 80		3.00	58 14
12/14	40				73 60	1.65	10 80			61 14
12/21	40				73 60	1.66	10 80			61 14
12/28	40				73 60	1.65	10 80			61 15
TOTAL 4TH QTR.					956 80	21.53	140 40	1.58	9.00	784 29
YEAR'S TOTAL					3712 40	83.56	548 30	22.25	36.00	3022 29

WITHHOLDING TAX CHART

WEEKLY - Official Treasury Figures Effective January 1, 1960

the wages are—		And the number of withholding exemptions claimed is—										
At least	But less than	0	1	2	3	4	5	6	7	8	9	10 or more
		The amount of income tax to be withheld shall be—										
$0	$13	18% of wages	$0	$0	$0	$0	$0	$0	$0	$0	$0	$0
13	14	$2.40	.10	0	0	0	0	0	0	0	0	0
14	15	2.60	.30	0	0	0	0	0	0	0	0	0
15	16	2.80	.50	0	0	0	0	0	0	0	0	0
16	17	3.00	.70	0	0	0	0	0	0	0	0	0
17	18	3.20	.80	0	0	0	0	0	0	0	0	0
18	19	3.30	1.00	0	0	0	0	0	0	0	0	0
19	20	3.50	1.20	0	0	0	0	0	0	0	0	0
20	21	3.70	1.40	0	0	0	0	0	0	0	0	0
21	22	3.90	1.60	0	0	0	0	0	0	0	0	0
22	23	4.10	1.70	0	0	0	0	0	0	0	0	0
23	24	4.20	1.90	0	0	0	0	0	0	0	0	0
24	25	4.40	2.10	0	0	0	0	0	0	0	0	0
25	26	4.60	2.30	0	0	0	0	0	0	0	0	0
26	27	4.80	2.50	.20	0	0	0	0	0	0	0	0
27	28	5.00	2.60	.30	0	0	0	0	0	0	0	0
28	29	5.10	2.80	.50	0	0	0	0	0	0	0	0
29	30	5.30	3.00	.70	0	0	0	0	0	0	0	0
30	31	5.50	3.20	.90	0	0	0	0	0	0	0	0
31	32	5.70	3.40	1.10	0	0	0	0	0	0	0	0
32	33	5.90	3.50	1.20	0	0	0	0	0	0	0	0
33	34	6.00	3.70	1.40	0	0	0	0	0	0	0	0
34	35	6.20	3.90	1.60	0	0	0	0	0	0	0	0
35	36	6.40	4.10	1.80	0	0	0	0	0	0	0	0
36	37	6.60	4.30	2.00	0	0	0	0	0	0	0	0
37	38	6.80	4.40	2.10	0	0	0	0	0	0	0	0
38	39	6.90	4.60	2.30	0	0	0	0	0	0	0	0
39	40	7.10	4.80	2.50	.20	0	0	0	0	0	0	0
40	41	7.30	5.00	2.70	.40	0	0	0	0	0	0	0
41	42	7.50	5.20	2.90	.50	0	0	0	0	0	0	0
42	43	7.70	5.30	3.00	.70	0	0	0	0	0	0	0
43	44	7.80	5.50	3.20	.90	0	0	0	0	0	0	0
44	45	8.00	5.70	3.40	1.10	0	0	0	0	0	0	0
45	46	8.20	5.90	3.60	1.30	0	0	0	0	0	0	0
46	47	8.40	6.10	3.80	1.40	0	0	0	0	0	0	0
47	48	8.60	6.20	3.90	1.60	0	0	0	0	0	0	0
48	49	8.70	6.40	4.10	1.80	0	0	0	0	0	0	0
49	50	8.90	6.60	4.30	2.00	0	0	0	0	0	0	0

$50	$51	$9.10	$6.80	$4.50	$2.20	$0	$0	$0	$0	$0	$0	$0
51	52	9.30	7.00	4.70	2.30	0	0	0	0	0	0	0
52	53	9.50	7.10	4.80	2.50	.20	0	0	0	0	0	0
53	54	9.60	7.30	5.00	2.70	.40	0	0	0	0	0	0
54	55	9.80	7.50	5.20	2.90	.60	0	0	0	0	0	0
55	56	10.00	7.70	5.40	3.10	.80	0	0	0	0	0	0
56	57	10.20	7.90	5.60	3.20	.90	0	0	0	0	0	0
57	58	10.40	8.00	5.70	3.40	1.10	0	0	0	0	0	0
58	59	10.50	8.20	5.90	3.60	1.30	0	0	0	0	0	0
59	60	10.70	8.40	6.10	3.80	1.50	0	0	0	0	0	0
60	62	11.00	8.70	6.40	4.10	1.70	0	0	0	0	0	0
62	64	11.30	9.00	6.70	4.40	2.10	0	0	0	0	0	0
64	66	11.70	9.40	7.10	4.80	2.50	.20	0	0	0	0	0
66	68	12.10	9.80	7.40	5.10	2.80	.50	0	0	0	0	0
68	70	12.40	10.10	7.80	5.50	3.20	.90	0	0	0	0	0
70	72	12.80	10.50	8.20	5.90	3.50	1.20	0	0	0	0	0
72	74	13.10	10.80	8.50	6.20	3.90	1.60	0	0	0	0	0
74	76	13.50	11.20	8.90	6.60	4.30	2.00	0	0	0	0	0
76	78	13.90	11.60	9.20	6.90	4.60	2.30	0	0	0	0	0
78	80	14.20	11.90	9.60	7.30	5.00	2.70	.40	0	0	0	0
80	82	14.60	12.30	10.00	7.70	5.30	3.00	.70	0	0	0	0
82	84	14.90	12.60	10.30	8.00	5.70	3.40	1.10	0	0	0	0
84	86	15.30	13.00	10.70	8.40	6.10	3.80	1.50	0	0	0	0
86	88	15.70	13.40	11.00	8.70	6.40	4.10	1.80	0	0	0	0
88	90	16.00	13.70	11.40	9.10	6.80	4.50	2.20	0	0	0	0
90	92	16.40	14.10	11.80	9.50	7.10	4.80	2.50	.20	0	0	0
92	94	16.70	14.40	12.10	9.80	7.50	5.20	2.90	.60	0	0	0
94	96	17.10	14.80	12.50	10.20	7.90	5.60	3.30	.90	0	0	0
96	98	17.50	15.20	12.80	10.50	8.20	5.90	3.60	1.30	0	0	0
98	100	17.80	15.50	13.20	10.90	8.60	6.30	4.00	1.70	0	0	0
100	105	18.50	16.10	13.80	11.50	9.20	6.90	4.60	2.30	0	0	0
105	110	19.40	17.00	14.70	12.40	10.10	7.80	5.50	3.20	.90	0	0
110	115	20.30	17.90	15.60	13.30	11.00	8.70	6.40	4.10	1.80	0	0
115	120	21.20	18.80	16.50	14.20	11.90	9.60	7.30	5.00	2.70	.40	0
120	125	22.10	19.70	17.40	15.10	12.80	10.50	8.20	5.90	3.60	1.30	0
125	130	23.00	20.60	18.30	16.00	13.70	11.40	9.10	6.80	4.50	2.20	0
130	135	23.90	21.50	19.20	16.90	14.60	12.30	10.00	7.70	5.40	3.10	.80
135	140	24.80	22.40	20.10	17.80	15.50	13.20	10.90	8.60	6.30	4.00	1.70
140	145	25.70	23.30	21.00	18.70	16.40	14.10	11.80	9.50	7.20	4.90	2.60
145	150	26.60	24.20	21.90	19.60	17.30	15.00	12.70	10.40	8.10	5.80	3.50
150	160	27.90	25.60	23.30	21.00	18.70	16.40	14.10	11.70	9.40	7.10	4.80
160	170	29.70	27.40	25.10	22.80	20.50	18.20	15.90	13.50	11.20	8.90	6.60
170	180	31.50	29.20	26.90	24.60	22.30	20.00	17.70	15.30	13.00	10.70	8.40
180	190	33.30	31.00	28.70	26.40	24.10	21.80	19.50	17.10	14.80	12.50	10.20
190	200	35.10	32.80	30.50	28.20	25.90	23.60	21.30	18.90	16.60	14.30	12.00
		18 percent of the excess over $200 plus—										
$200 and over		36.00	33.70	31.40	29.10	26.80	24.50	22.20	19.80	17.50	15.20	12.90

You will note on the employee's individual record that the first entry, in the first quarter, shows the following deductions:

F. I. C. A.	$1.57	= $2\frac{1}{4}$% of $70.00 (This was the rate current at the time.)
Withholding Tax	10.50	= amount listed on Withholding Tax chart under one dependent, in line with $70.00
S. U. C. & T. D. B.	0.53	= $\frac{3}{4}$% of $70.00
Union Dues	3.00	
Total deductions	$15.60	
Net earnings	54.40	
Gross earnings	$70.00	

The money received after the various deductions is known as "net pay" but it is often termed "take home pay."

ASSIGNMENT:

1. Using the following schedules of rates for operators, figure the total weekly salary of the following women:

	Worker		Style #803 $1.56 per dr.	Style #883 $1.40	Style #804 $1.10	Style #805 $1.37
a.	Carr	(1)*	19 dresses	22 dresses	7 dresses	11 dresses
b.	Fuller	(0)	14 dresses	24 dresses	11 dresses	5 dresses
c.	Mason	(2)	17 dresses	15 dresses	10 dresses	8 dresses
d.	Paulson	(0)	18 dresses	19 dresses	12 dresses	10 dresses
e.	Peters	(1)	21 dresses	18 dresses	9 dresses	7 dresses
f.	Ward	(0)	15 dresses	17 dresses	8 dresses	5 dresses

Figure the "take home pay" of each of the above workers using a deduction rate of 3% for F. I. C. A. and $\frac{3}{4}$% for S. U. C. Use the Withholding Tax chart on the previous page.

* The number in parenthesis signifies the number of dependents.

2. Many workers are paid a special rate when they work over their regular 7-hour day. The number of hours worked over the stated number is called overtime. Usually the rate for overtime is $1\frac{1}{3}$ times the first rate.

Figure the total week's pay for each of the women listed in this table. They received overtime for work over 35 hours.

Worker	Hourly Rate	Hours Worked
Dunn	$1.58	35
Bien	1.85	37
Keyes	2.28½	42
Atkens	1.95½	40
Dale	1.25	35

3. The "floor girl" was paid $40.00 a week. She worked 5 days, seven hours a day. What was her rate of pay per hour?

4. The forelady received a salary of $90.00. She worked 5 days a week, seven hours a day.
   a. What is her rate of pay per day?
   b. What is her rate of pay per hour?
   c. What is her pay for the month of February?

5. Compute the net pay on the following: 35 hours @ $1.95½ per hour.
   Deductions:
      Withholding tax, one dependent
      Hospitalization .... 97¢
      F. I. C. A. 2¼%
      S. U. C. .... ¾%

6. Figure the gross earnings for the following women who do floor work (trimmers, hemmers, pinkers, sorters, etc.) A half hour is allowed for lunch (12:00 to 12:30). They received time-and-a-half for overtime (any time over 35 hours).

Worker	Rate per hr.	Mon. in out	Tues. in out	Wed. in out	Thurs. in out	Fri. in out
Lewis	$1.70	8:30-4:30	8:30-5:00	8:30-12:00	8:30-5:30	8:30-5:00
Dudec	1.25	12:30-4:30	8:30-4:00	8:30- 5:00	8:30-4:30	8:30-4:30
Clark	1.58	9:00-5:00	8:30-12:00	--------	8:30-5:00	8:30-6:00
London	1.38½	8:30-5:00	9:00-5:00	9:00-5:00	8:30-5:00	8:30-5:30

UNIT VIII - ACCOUNTS

Writing Invoices and Checking Daily Sales Records

Lesson No. 5

OBJECTIVES: To learn how to make out invoices.

To understand the procedures in checking daily sales records.

RELATED INFORMATION:

Once the garments are ready for shipment, it is customary for the seller to submit to the purchaser a bill of invoice. An invoice is an itemized bill given or sent to a customer with the goods ordered. The invoice or charges are written on a special billing machine by the billing clerk for every delivery made to each individual customer.

Invoices are usually made out in triplicate. The original or first copy is sent to the customer along with the shipment of garments. The duplicate or second copy is sent to the office for the bookkeeping department. The third and final copy is kept in the shipping department for a check on all shipments. The following information should appear on the invoice:

a. Date of shipment

b. Customer's name and complete address

c. Customer's order number

d. Salesman

e. Terms

f. Shipping method used

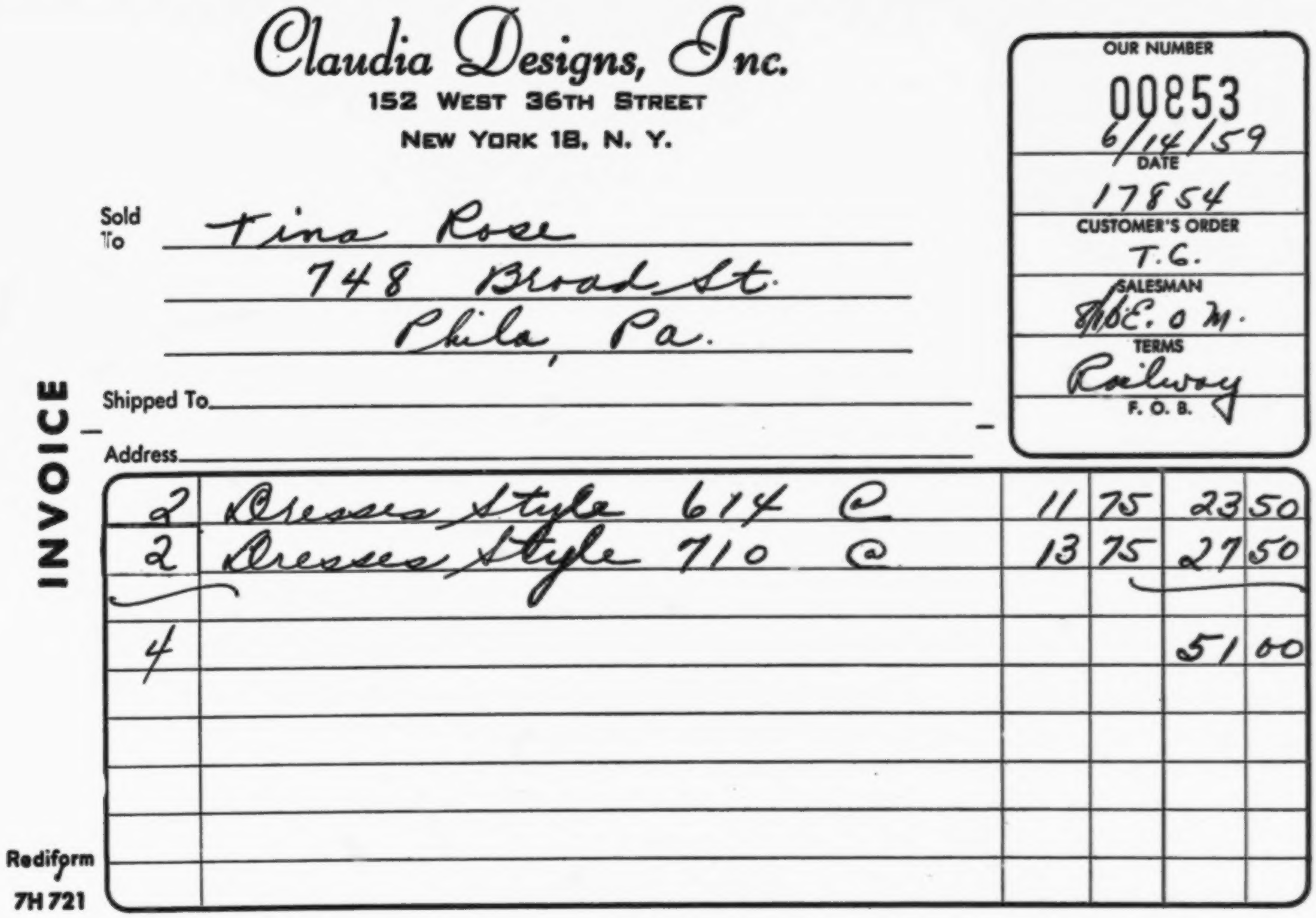
g. Quantity of dresses being shipped

h. Style numbers of garments being shipped

i. Price per garment

j. Extension

An examination of the following invoice will show that it containс the information listed above.



Claudia Designs, Inc.
152 WEST 36TH STREET
NEW YORK 18, N. Y.

INVOICE

Sold To Tina Rose
748 Broad St.
Phila, Pa.

Shipped To

Address

OUR NUMBER 00853

6/14/59
DATE

17854
CUSTOMER'S ORDER

T.G.
SALESMAN

ME. O M.
TERMS

Railway
F. O. B. ✓

2	Dresses, Style 614 @	11	75	23	50
2	Dresses, Style 710 @	13	75	27	50
4				51	00

Rediform
7H721

PROCEDURE:

1. Check the number of garments that are ready for shipment.

2. Bill the customers for garments to be charged, remembering to include all items listed above.

3. Re-check the calculations before the invoices are sent out.

4. At the end of the day, a total of all garments charged to customers is taken, according to style and price.

Example: On April 24th, Claudia Dress Co. had total sales of $2,028.19. In cross-checking the total garments shipped according to style and price, the bookkeeper made up the following report:

Style #883	72 dresses	@	$9.75	=	$ 702.00
Style #886	56 dresses	@	9.75	=	546.00
Style #884	74 dresses	@	9.75	=	721.50
Style #1066	2 dresses	@	15.75	=	31.50
Style #1073	2 dresses	@	12.75	=	25.50
		P. P. & Ins.			1.69
					$2,028.19

ASSIGNMENT:

1. Make out invoices for the following shipments sent out on May 4th, 19__, terms 8/10 E.O.M.

   a. To Jones & Co., 114 Fifth St., Detroit, Mich., 4 dresses style #803 at $9.75; 5 dresses style #804 at $8.75; 6 dresses style #805 at $12.75. Package was sent by Railway Express.

   b. To R. Armstrong, 17 Oak Rd., Norfolk, Va., 12 dresses style #805 at $12.75; 7 dresses style #806 at $11.75; and 10 dresses style #807 at $9.75. Sent by Railway Express.

   c. To J. C. Perry, 119 Lee Av., Charleston, S. C., 2 dresses style #809 at $13.75 each. Package weighed 5 lbs., was sent by parcel post and insured. Use postal and insurance rates listed in Unit I, Lesson No. 7; consider Charleston in Zone 4.

d. To Town & Country Shop, 75 Hillsdale Av., Baltimore, Md., 3 dresses style #883 at $9.75; 5 dresses style #809 at $13.75; 6 dresses style #807 at $9.75. Sent parcel post, insured. Weight, 18 lbs.; zone 2.

e. Conners', Hartford, Conn.; 2 dresses style #805 at $12.75; 2 dresses style #812 at $15.75; 1 dress style #883 at $9.75. Parcel post, insured. Weight, 7 lbs.; zone 2.

f. Harold's, Inc. Cleveland, Ohio; 25 dresses style #883 at $9.75. Railway Express.

g. Maggie's, New Orleans, La.; 5 dresses style #883 at $9.75; 4 dresses style #805 at $12.75. Parcel post, insured. Weight, 11 lbs.; zone 6.

h. The Parisian, San Francisco, Calif.; 1 dress style #883 at $9.75; 2 dresses style #809 at $13.75. Parcel post, insured. Weight, 5 lbs.; zone 8.

i. Gift and Style Shop, New York, N.Y., 7 dresses style #807 at $9.75. Parcel post, insured. Weight, 9 lbs.; zone 1.

j. Jean's Dress Shop, New Orleans, La.; 3 dresses style #803 at $9.75; 3 dresses style #806 at $11.75; 1 dress style #804 at $8.75. Parcel post, insured. Weight, 12 lbs.; zone 6.

k. Dot's Dress Shop, Duluth, Minn.; 3 dresses style #807 at $9.75; 2 dresses style #806 at $11.75. Parcel post, insured. Weight, 10 lbs.; zone 5.

l. Bon Marché, San Francisco, Calif.; 1 dress style #812 at $15.75; 2 dresses style #809 at $13.75; 5 dresses style #883 at $9.75. Railway Express.

After all invoices are written out and checked, make out the daily total of styles, prices, etc. What is the total of all invoices? What is the total of styles shipped?

Purchase Orders and Requisitions

Lesson No. 6

OBJECTIVE: To learn how to make out purchase orders.

RELATED INFORMATION:

The purchasing department in most garment concerns consists of the trimmings buyer and piece goods buyer. Once the estimates are made for the fabric and trimmings needed (as in Unit I, Lesson 4), the next step is the placement of the purchase orders.

Purchase orders, like all other business papers, vary in size and form to meet the individual needs of a business. These orders are usually numbered and are made out in duplicate. The original is sent to the company with whom the order is to be placed and the duplicate is kept by the person placing the order (the trimmings buyer or piece goods buyer).

For each product that is purchased and consumed the buyer should keep detailed information with regard to sources, specifications, quantity consumed, quantity purchased in the past, prices, and price trends.

The buyer of any firm should:

1. Buy only from reputable firms.
2. Have a list of available sources from which materials can be obtained.
3. Be well informed on the specifications of all materials needed.
4. Have a knowledge of the prevailing prices of materials needed.
5. Consider his needs and avoid over-stocking.

PROCEDURE

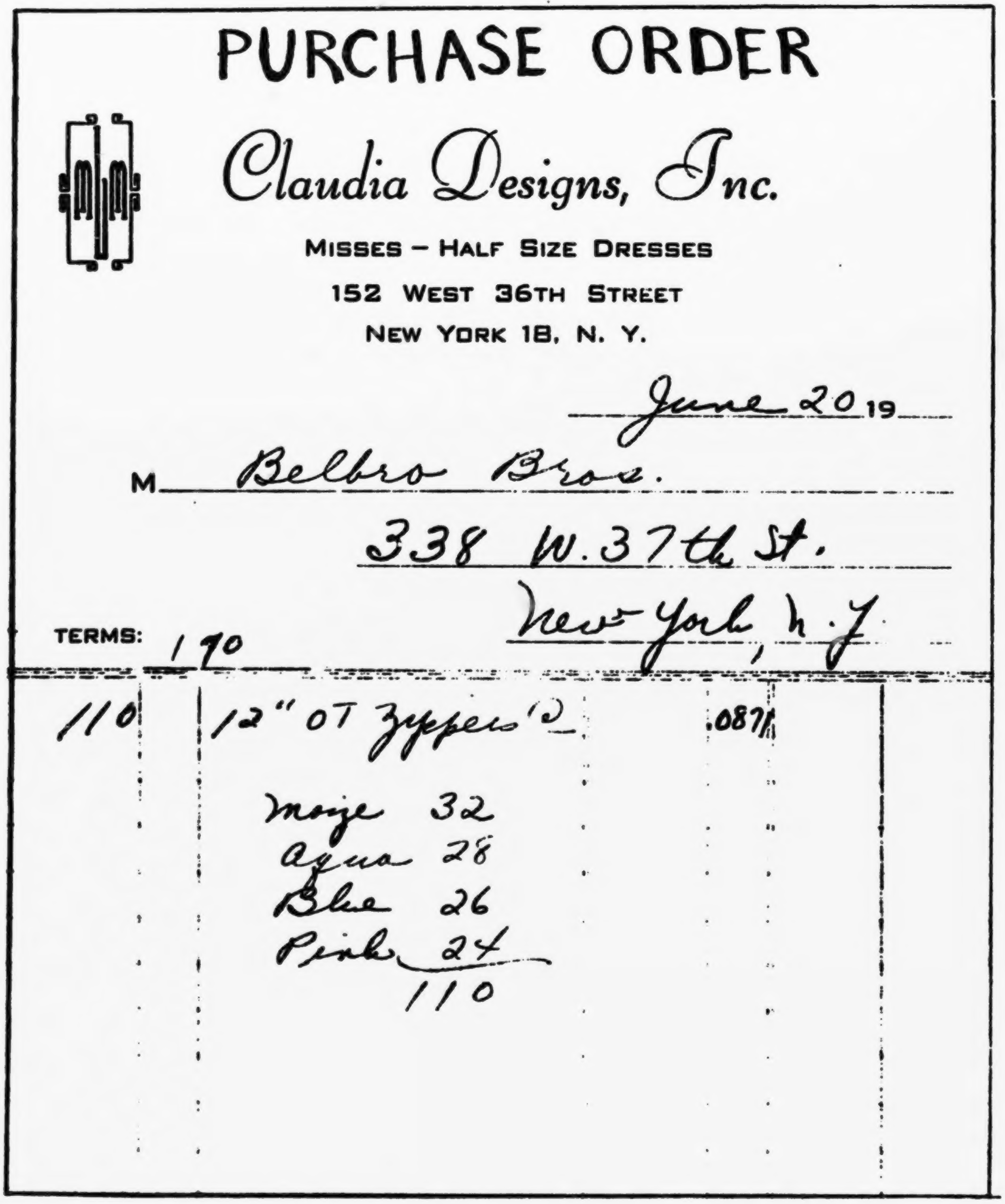
The Trimmings Buyer should:

1. Re-check estimates of trimmings needed.
2. Check price of item with concern to which she is sending an order, before mailing order or calling in order by phone.
3. Make out purchase orders for all items needed. Be sure to state color, size, quantity, and price.

The Piece Goods Buyer should:

1. **Refer to style number of garment which is being cut and check average yardage needed per dress.**
2. **Re-check estimate for total yardage.**
3. **Make out purchase order for fabric needed. Be sure to state name or type of fabric, color, quantity, and price.**

   Example: Following is an illustration of a purchase order issued for trimmings for style #805:



PURCHASE ORDER

Claudia Designs, Inc.

MISSES – HALF SIZE DRESSES

152 WEST 36TH STREET

NEW YORK 18, N. Y.

June 20 19

M Belbro Bros.

338 W. 37th St.

New York, N.Y.

TERMS: 1/10

110	12" OT Zippers @	.0871	
	Maize 32 Aqua 28 Blue 26 Pink 24 110		

ASSIGNMENT:

1. Make out the purchase orders that would be made by the trimmings buyer to cover estimates for garments ordered by customers and recorded on cutting tickets in Unit I, Lesson No. 4; combine all notions and trimmings of the same size and color, using the style descriptions given in Lesson No. 2 of the same unit. Separate purchase orders for different items, such as zippers, buttons, etc.

2. Make out the purchase orders that would be sent out by the piece goods buyer to cover estimates for the same garments as in question No. 1, combining all fabrics that are the same in type and color.

Inventories **Lesson No. 7**

OBJECTIVE: To become familiar with computing inventories.

RELATED INFORMATION:

A merchandise inventory is the value of the unsold goods. A merchant must obtain the value of the unsold merchandise before he can know the results of operating his business. The end-of-period inventory is determined by counting and listing all merchandise on hand held for sale, pricing such merchandise at cost, and totaling the money amounts.

PROCEDURE:

There is no universal procedure for taking an inventory. Probably the simplest procedure is as follows: Two people work as a team; one person counts, weighs, or otherwise measures the merchandise and calls the descriptions and quantities to the other person, who writes the information on inventory sheets. The unit value of each article, which is generally its cost price, is written after the description, and this value is multiplied by the quantity on hand to determine the total value of such unsold articles.

Each extension is written opposite the respective quantity description and unit price. These extensions are then added to obtain the total value of all merchandise listed in the inventory. This grand total is referred to as the value of the merchandise inventory. The taking of an inventory is sometimes referred to as taking stock.

INVENTORY June 30, 19

PAGE 1

SHEET NO.

PRICED BY a. J. C.

CALLED BY A.J.C.

DEPARTMENT Piece Goods

EXTENDED BY a. J. C

ENTERED BY L.C.Y.

LOCATION

EXAMINED BY S.N

CHECK	QUANTITY		DESCRIPTION	✓	PRICE	EXTENSIONS
✓	220 3/4	yds	Combed Chambray	✓	.55	121 41
✓	170 1/2	yds	Combed Chambray	✓	.60	102 30
✓	249 3/4	yds	Dimity	✓	.475	118 63
✓	376 1/2	yds	Colored Seersucker	✓	.675	254 14
✓	771	yds	Spun Rayon	✓	.65	501 15
✓	232 1/2	yds	Spun Rayon	✓	.70	162 75
✓	12	yds	Chiffon Voile	✓	.625	7 50
✓	25	yds	Pinwhale pique	✓	.37	9 25
✓	40	yds	waffle pique	✓	.37	14 80
✓	49	yds	unbleached muslin	✓	.24	11 76
✓	120	yds	Broadcloth	✓	.65	78 00
✓	315	yds	Tissue gingham	✓	.55	173 25
✓	635	yds	Dotted Swiss	✓	.68	431 80
			Total Piece Goods Inventory			1986 74

ASSIGNMENT:

1. Prepare an inventory sheet with the headings used in the inventory illustrated on the previous page. List the following items and find the total value of this inventory:

$44\frac{1}{2}$	yds. solid color flannel	@ $37\frac{3}{4}$¢ per yd.
$75\frac{1}{4}$	yds. printed flannel	@ \$.375 per yd.
295	yds. percale prints	@ \$.355 per yd.
282	yds. solid percales	@ 34¢ per yd.
$108\frac{3}{4}$	yds. organdy	@ 40¢ per yd.
36	yds. $\frac{1}{4}$" elastic	@ 57¢ per dz. yds.
12	yds. $\frac{1}{2}$" elastic	@ 95¢ per dz. yds.
18	yds. 1" elastic	@ 1.60 per dz. yds.
$3\frac{1}{2}$	gross buttons Navy/30	@ 4.25 a gr.
$6\frac{1}{12}$	gross smoked pearl/24	@ 4.50 a gr.
30	cones white thread	@ 1.33 a cone
8	boxes #50 thread	@ 2.88 a box

2. The following inventory was taken by two employees of Mara Dress Company: (dress manufacturers)

Fabrics:

335	yards of pima broadcloth	@ $97\frac{1}{2}$¢ per yd.
530	yards of powder puff muslin	@ 60¢ per yd.
$1051\frac{1}{4}$	yards of spun rayon	@ 70¢ per yd.
$567\frac{3}{4}$	yards of spun rayon	@ 65¢ per yd.
105	yards birdseye piqué	@ 95¢ per yd.
385	yards of Bates Discipline	@ $64\frac{3}{4}$¢ per yd.
$294\frac{3}{4}$	yards woven denim	@ 38¢ per yd.
$316\frac{1}{2}$	yards combed chambray	@ $57\frac{1}{2}$¢ per yd.

Trimmings:

$8\frac{1}{2}$	gross asst'd colors/24 buttons	@ \$4.25 a gr.
$7\frac{3}{4}$	gross /30 buttons	@ 6.00 a gr.
11	gross self-butt. flat/24	@ 1.25 a gr.

Notions:

512 12" pl. zippers	@ $0.0891 per zip.
836 14" O. T. zippers	@ 0.0987 per zip.
425 7" sk. zippers	@ 0.065 per zip.

Completed Dresses:

135 dresses style #883	@ 5.81 each
76 dresses style #887	@ 6.13 each
33 dresses style #1074	@ 6.24 each
23 dresses style #886	@ 5.75 each
15 dresses style #885	@ 4.95 each

List the above items and find the total value of this inventory.

3. The following inventory was taken by two employees of the dress department of the Woodbridge Department Store:

36 dresses	@ $5.75 each
24 dresses	@ 6.75 each
18 dresses	@ 7.75 each
58 dresses	@ 8.75 each
63 dresses	@ 9.75 each
32 dresses	@ 10.75 each
49 dresses	@ 12.75 each
37 dresses	@ 14.75 each

Copy the above items on an inventory sheet and find the total value of this inventory.

4. Make out an inventory sheet like the sample and list all of the supplies in the storage closets in the needle trades room. Sub-head the inventory into groups such as: fabrics, trimmings, notions, etc.

UNIT VIII - ACCOUNTS

Business Forms - Profit and Loss Statement   Lesson No. 8

OBJECTIVES: To learn the importance of a profit and loss statement to every businessman.
To learn how to prepare a profit and loss statement.

RELATED INFORMATION:

Not all business is profitable at all times. There are periods of time when profits are small, and other periods when actual losses are sustained. A business cannot be run without expense. One of the first things to consider in a business is to make sure that enough profit is made from transactions to cover expenses and have enough left to pay the owners of the business a reasonable compensation for running it. A business cannot long exist when expenses continue to exceed income.

To determine whether or not the business has been profitable, every business concern determines periodically how much the profit (or loss) has been. The proprietor is anxious to know whether there is a profit or a loss, and, from time to time, what may be the financial status. Accordingly, at least once a year, or monthly, as is the case in many lines of business, the bookkeeper prepares a profit and loss statement and a balance sheet, thus giving the owner valuable information about his business.

PROCEDURE:

To learn to prepare this important business statement, you must give careful study to the content and the arrangement of the illustrated forms of these statements.

The following terms used in the profit and loss statement must be studied:

Gross Sales - represents the amount of goods sold to customers, without considering the goods returned by customers, or allowances made for broken or damaged goods.

Return Sales - the term given to merchandise returned by customers. The value of the merchandise returned must be deducted from the gross sales.

Net Sales - the value of the goods actually sold and not returned. It is the difference between the gross sales and the returns and allowances.

Merchandise Inventory - the value of unsold goods.

Purchases - total cost of goods bought.

Gross Profit - the difference between the cost of goods sold and the net sales.

Operating Expenses - includes selling expenses, charges against income, and overhead expenses.

Net Profit - what is left of the gross profit after all expenses are paid. In its relation to sales, net profit indicates whether the volume of sales justifies the expenditure or not.

PROFIT AND LOSS STATEMENT

June 30, 19__

Gross Sales		$7475.00
Less: Goods Returned	$225.00	
Damaged Goods	115.00	
Total returns and allowances		340.00
Net Sales		$7135.00
Merchandise Inv. May 31	$5875.00	
Purchases	3143.00	
Total Cost of Goods for Sale	9018.00	
Less: Inventory June 30,	4250.00	
Cost of Goods Sold		4768.00
Gross Profit		2367.00
Selling Expense		1427.00
Net Profit		$ 940.00

In analyzing the above statement you can see that the first figure needed is the net sales, which is the gross sales less any returns or allowances made during the month.

To find the cost of goods sold, this simple rule applies: beginning-of-month inventory plus purchases, less inventory at the end of the month. The gross profit is found by subtracting the cost of goods sold from the net sales. The net profit is found by subtracting all operating expenses from the gross profit.

ASSIGNMENT:

1. Find the net sales in each of the following:

    a. In a certain store the sales for the month of May amounted to $6892.60. In the week following, goods amounting to $575.40 were returned.

    b. The sales for a given period in a dress manufacturing firm amounted to $28,921.50. Customers returned as unsatisfactory goods amounting to $1450.75.

    c. The gross sales of Claudia Dress Co. amounted to $115,821.50. Due to faulty packing some of the merchandise was damaged in delivery and they allowed their customers $1,275.00.

2. Find the cost of goods sold in each of the following:

	Inventory (beg. o. m.)	Purchases	Inventory (e. o. m.)
a.	$2191.50	$3284.63	$1876.98
b.	5678.32	6387.29	4724.88
c.	7287.61	4159.76	3948.90
d.	1928.50	8439.62	1729.54

3. Find the gross profit on sales in each of the following:

    a. A merchant's sales for 6 months were $23,450.00. He had $3245.00 worth of merchandise on hand at the beginning of the period, and he bought $18,750 worth of merchandise during the half year. At the end of the 6 months his inventory was $3825.00.

    b. A man's sales for one month amounted to $19,842.50. At the beginning of the month he had on hand merchandise worth $4326.80. During the month he purchased merchandise worth $14,596. and at the close of the month his inventory was $5321.64.

c. Inventory at the beginning of a period was $3642.50 and purchases were $12,367.80 for the period. The sales were $13,210.60. The inventory at closing was $1950.50.

4. Find the net profit in each of the following:

a. If your gross profit is $5675 and your expenses are $1960, how much is your net profit?

b. Your gross profit from sales of goods is $6450. Your selling expenses are: rent $500; salaries $1400; and other expenses $650. How much is your net profit?

5. Set up a statement of profit and loss for each of the following:

a. The net sales for a year were $65,000. Inventory at the beginning of the year was $13,960, and purchases were $48,540. The overhead expenses were: rent $3300; wages $5400; store and office supplies $1600; fuel and lights $1140; delivery expense $1800. At the close of the year the inventory of merchandise was $17,500.

b. A clothier's inventory of merchandise at the beginning of the month was $13,752. Purchases for the month were $51,968. He paid for rent $2800; light and fuel $750; wages $6600; delivery expense $2400; and miscellaneous expenses $1250. Merchandise inventory at the end of the month was $15,720. Sales were $71,300.

Business Forms - Balance Sheet **Lesson No. 9**

OBJECTIVES: To learn the importance of a balance sheet to every businessman.

To learn how to prepare a balance sheet.

RELATED INFORMATION:

The balance sheet shows all the assets and the liabilities of an individual or a firm. This form of report is frequently required when a business concern wishes to borrow money from a bank. It shows whether the applicant owns sufficient assets to pay debts (liabilities); that is, whether his business is solvent or not. The present worth, also called net worth or capital, is the difference between the total assets and the total liabilities.

PROCEDURE:

When preparing a financial statement one must keep in mind two simple definitions and one equation, called the "balance sheet equation". The definitions are:

Assets are things owned which have a money value.

Liabilities are debts owed to others.

The equation is:

Assets - Liabilities = Capital

Following is a balance sheet prepared by Claudia Dress:

CLAUDIA DRESS CO.
Balance Sheet

As of June 30, 1960

Assets

Cash	$21,130.00	
Accounts Receivable	5,500.00	
Notes Receivable	4,500.00	
Merchandise Inventory	5,600.00	
Office Furniture	850.00	
Delivery Equipment	950.00	
Total Assets		$38,530.00

Liabilities

Accounts Payable	$3,400.00	
Notes Payable	2,800.00	
Total Liabilities		6,200.00
Net Worth		32,330.00
		$38,530.00

ASSIGNMENT:

1. Prepare balance sheets from the facts given in each of the following problems:

   a. On August 31, 19__, Marvin Duff has: cash $840; debts of J. C. Smith $450 and of F. B. White $360; mdse. inventory $1870; store equipment $350; and office equipment $200. Duff owes R. M. Cooper $190 and C. D. Wilson $260. His investment at the beginning of August was $3500, and he made a net profit of $120 during the month.

   b. On September 30, 19__, L. M. Doyle has: cash $978; debt of C. D. Moore $550; mdse. inventory $1310; store equipment $175; and office equipment $140; Doyle owes James Newman $200 and Burns Co. $315. His investment at the beginning of September was $2500, and he made a net profit of $138 during the month.

c. On June 30, 19__, Joan Smith, a speciality store owner, had: cash $759; mdse. inventory $2060; accounts receivable $322; office equipment $145; store equipment $525; accounts payable $602. Her investment at the beginning of June was $3000, and she made a net profit of $189.

2. Copy the amounts given below on a sheet of paper. Fill in the blank spaces.

	Assets	Liabilities	Capital
a.	$2.745	$371	------
b.	------	680	$3,320
c.	------	965	13,735
d.	2,519	----	1,632
e.	4,675	610	------
f.	5,487	----	3,965

3. Define and give illustrations of (a) assets and (b) liabilities.

4. Who besides the owner might be interested in having a balance sheet of a business?

TRIAL EXAMINATION

Note to Teacher: **This trial examination can be used as the basis for a final exam. Questions can be adjusted, added, or deleted to fit the extent of work covered.**

ADDITION:

1.	**27,624**	**2.**	**8,543**	**3.**	**6,535**	**4.**	**48,713**
	8,792		**4,621**		**1,722**		**24,457**
	23,360		**5,936**		**3,241**		**5,061**
	31,076		**9,326**		**12,079**		**4,562**
	49,003		**4,434**		**18,586**		**58,493**
					5,768		

5. **Vertical and horizontal addition:**

$2 + 9 + 4 + 7 + 8 + 9 =$

$8 + 4 + 3 + 8 + 6 + 4 =$

$9 + 4 + 6 + 3 + 9 + 6 =$

$7 + 2 + 5 + 8 + 2 + 9 =$

$6 + 5 + 8 + 9 + 6 + 8 =$

$\underline{13} + \underline{9} + \underline{7} + \underline{5} + \underline{7} + \underline{7} =$

$? \quad ? \quad ? \quad ? \quad ? \quad ? =$

6. $23 + 106 + 295 + 519 + 63 + 54 + 75 =$

7. $\frac{1}{16} + \frac{3}{16} + \frac{1}{8} + \frac{11}{32} + \frac{7}{16} + \frac{19}{32} =$

8. $\frac{2}{3} + \frac{7}{18} + \frac{20}{36} + \frac{27}{36} =$

9. $0.0024 + 7.023 + 281.04 + .823 =$

10. $7.12\frac{3}{4} + .06\frac{1}{2} + 75\frac{1}{4} + 12\frac{3}{8} =$

SUBTRACTION:

1. A woman had a bank account of $1754.20. She bought a sewing machine for eighty-nine and three-tenths dollars; material for a dress, suit, and coat cost one hundred fifteen and four-fifths dollars; scissors, yardstick, and other sewing equipment came to twenty-seven and seven-tenths dollars. How much had she left in the bank?

2. A dealer had on hand $\frac{5}{6}$ of a dozen children's rompers and bought $3\frac{1}{2}$ dozen more. He sold 41 of them. How many rompers had he left?

3. $895\frac{3}{8} - 760\frac{5}{8} = ?$

4. $71\frac{3}{4} - 6\frac{5}{8} - 7\frac{1}{4} - 18\frac{1}{2} = ?$

5. The trimmings buyer had on hand $4\frac{3}{4}$ gross navy buttons/30. She used $2\frac{7}{8}$ gross for style #304. How many gross buttons were left? How many buttons?

6. $\frac{1}{2}$ lb. $-$ $\frac{3}{8}$ lb. $+$ $2\frac{7}{8}$ lbs. $-$ $\frac{3}{16}$ lbs. $= ?$

7. $235\frac{1}{24} - 164\frac{1}{3} = ?$

8. $\$647\frac{3}{5} - \$249\frac{3}{20} = ?$

9. $324.82 - 8.63 - 24.8 - 75.25 = ?$

10. A retail store received the following shipments of dresses: $25.75, $37.50, $110.25 and $19.50. They returned two dresses @ $11.75 each. What was the amount due the wholesaler for merchandise received by the store?

MULTIPLICATION:

1. If the capital of a certain establishment is $75,500 and its annual business is 3.2 times its capital, what is its annual business?

2. In a yard goods department, Mary sold the following lengths of material:

a. 18" @ 70¢ a yd.
b. 24" @ 90¢ a yd.
c. 48" @ 69¢ a yd.
d. 54" @ 89¢ a yd.
e. $3\frac{3}{8}$ yds. @ 72¢ a yd.
f. $4\frac{1}{4}$ yds. @ $1.10 a yd.
g. $2\frac{5}{8}$ yds. @ 95¢ a yd.
h. $5\frac{1}{2}$ yds. @ $3.55 a yd.

Figure the cost of each length of material and compute the total cost of all material sold.

3. A man worked $13\frac{1}{2}$ hours and received $1.40 an hour. How much did he earn?

4. $19.13 x $3\frac{3}{4}$ = ?

5. 7.641 x $67\frac{2}{3}$ = ?

6. If one gross buttons costs $5.25, what would 23 gross cost?

7. An operator who earns an average of $76 a week saves 3% of her earnings. Find her yearly earnings and yearly savings, if she works 50 weeks a year.

8. A merchant paid $45.00 for a dozen broadcloth blouses and sold them at a gain of 30% on a blouse. Find the gain and selling price per blouse.

9. Find the cost of 125 dresses made of dacron/cotton at 69¢ a yard and buttons @ $4.75 a gross, if each dress requires seven and one-half yards and thirteen buttons. Labor cost for each dress is $4.10. Find the gross profit and selling price of the dress at a 12% mark-up.

10. Clara is given $1\frac{1}{2}$% commission on all sales she makes, in addition to her regular pay of $55.00 a week. If her sales amounted to $1758.50, what is her pay and commission in one week?

DIVISION:

1. Five buttons were used on style #604. At what gross price must the trimmings buyer purchase buttons, if the allowance per dress is 18¢?

2. If 9½ yards of fabric cost $9.50, what will 2½ yards cost?

3. If a manufacturer has 535 yards of fabric to be used for style #714, which takes 3¼ yards per dress, how many dresses will be produced?

4. At $9.75 per dress, how many can be bought for $244.00?

5. In the checking of her pattern, Mary found that it was $1\frac{3}{4}$ inches too long. What size tuck would she make in her pattern?

6. Joan purchased 2½ yards of 36" material for a gathered skirt. Her waist measurement was 27" and her skirt length, including hem, was 32". She decided she wanted a 4 : 1 fullness. Did she have enough fabric? If not, how much did she need?

7. A firm received 255 yards of fabric. The invoice amounted to $106.95. What was the cost per yard?

8. What was the percentage mark-up allowed on a coat selling for $125.00, if the cost price was $93.75?

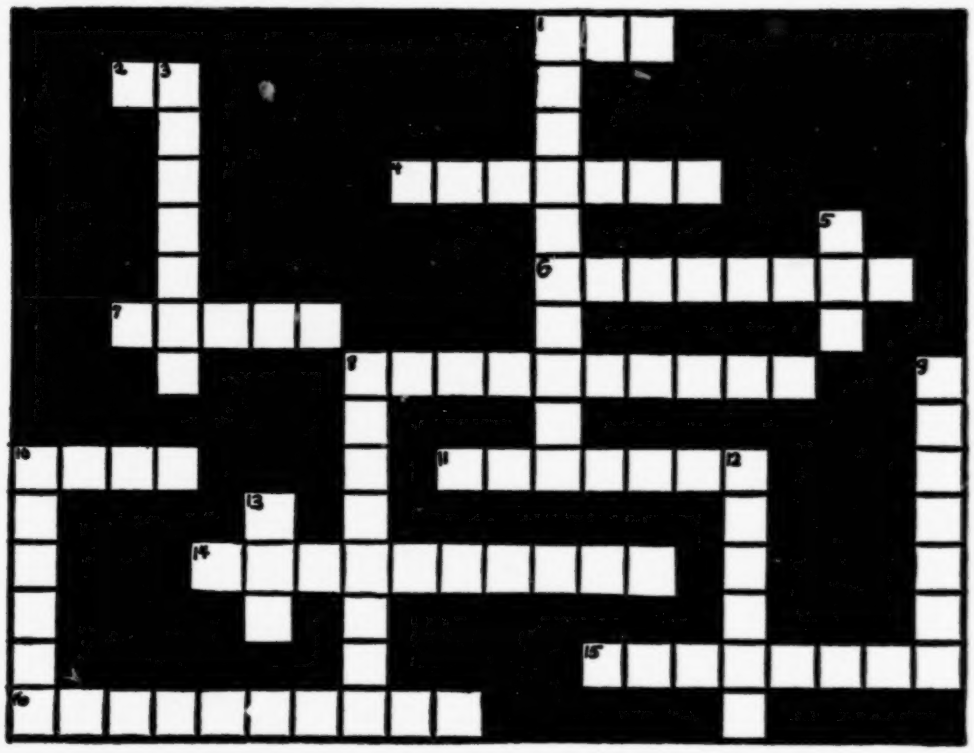
9. How many are there in:
   a. 12% of 10 gross of buttons
   b. 12½% of 96 zippers.

10. If it costs $458.85 to produce 95 dresses, what is the cost of one dress? What would be the gross profit earned if the dresses were sold at $8.75 each?

11. What would be the diameter of a circular skirt if the circumference was 52"?

PUZZLE:

Arithmetic Terms Puzzle



ACROSS

1. To combine two or more numbers into one sum

2. The abbreviation for yard

4. The ones' product, tens' product, hundreds' product, and so on, in a multiplication problem are called ——— products.

6. To find the total number in a stated number of equal groups

7. The whole sum or amount

8. In the example, ¼ of 20 = 5, 5 is a ——— part.

10. The number of square units in a flat surface is its ———.

11. .5 is a ——— fraction.

14. In the example, 8 − 6 = 2, 6 is the ———.

15. The answer to a division problem

16. The answer to a subtraction problem

DOWN

1. The subject of this puzzle

3. In the example, 6 ÷ 2 = 3, 2 is the ———.

5. The formula for finding the area is ——— = ——— × ———.

8. A part of a number or object

9. The answer to a multiplication problem

10. A number to be added to another number to make the sum

12. The opposite of width

13. The answer to an addition problem

Douglas Sierka

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UNIT I - WHOLE NUMBERS

ACHIEVEMENT TEST NO. 1

EXERCISE I: Write the following numbers in words:

1.	150,000,000	3.	62,050	5.	12,080
2.	4,786,221	4.	791,000		

EXERCISE II: Write the following numbers:

6. Eighteen thousand, sixteen
7. Ninety-two million, three hundred thousand
8. Seven hundred twenty-five thousand
9. One million, six thousand, forty-eight
10. Four thousand, eight hundred ninety-seven

EXERCISE III. Problems in fundamental combinations:

11. 6 x 5 + 7 - 5 ÷ 8 x 6 ÷ 24 =
12. 10 x 10 ÷ 10 + 10 - 10 =
13. 7 x 9 + 17 ÷ 8 + 10 ÷ 4 x 13 =
14. 8 ÷ 2 x 12 + 40 - 4 ÷ 2 =
15. 35 + 91 + 7 + 66 + 13 + 63 ÷ 11 =

16. If the enrollments in the high schools in a city are respectively: 1751, 1892, 2634, 1052, 2445, 2109, and 1474, what is the total number of high school pupils in that city?

17. In a "lot" of 328 dresses, how many would each operator be allotted if the shop consists of 41 operators?

18. 95 is how much less than 149?

19. Find the difference of 132 and 65.

20. Find the average yardage of nine bolts of material if they measure 101, 119, 96, 112, 130, 118, 127, 114, and 136 yards respectively.

21. At the end of the season the following number of dresses had been sold: 357 in style #217, 468 in style #221, 132 in style #218, 648 in style #219, 1327 in style #220. What was the total number of dresses sold? At an average materials cost of $5.69 each, what was the total materials cost?

22. In a lot of 239 dresses, a finisher had to sew 9 buttons on each dress. What was the total number of buttons to be sewed?

23.	8179	24.	4609	25.	5784	26.	608
	x 5469		- 785		x 906		x 907

UNIT II - FRACTIONS

ACHIEVEMENT TEST No. 2

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1. In a needle trades class, $\frac{2}{5}$ of the girls did not complete the course. There were 40 girls in the class. How many did not complete the course?

2. Arrange the following fractions according to size, the largest first:

   a. $\frac{1}{8}$, $\frac{3}{4}$, $\frac{6}{16}$, $\frac{1}{2}$, $\frac{3}{16}$

   b. $\frac{3}{8}$, $\frac{7}{24}$, $\frac{1}{6}$, $\frac{3}{12}$, $\frac{20}{48}$

   c. $\frac{2}{3}$, $\frac{6}{4}$, $\frac{5}{12}$, $\frac{5}{6}$, $\frac{1}{2}$

3. Addition of fractions:

a.	b.	c.
$47\frac{7}{12}$	$6\frac{1}{8}$	$33\frac{1}{2}$
$8\frac{3}{4}$	$8\frac{7}{8}$	$9\frac{7}{8}$
$\underline{16\frac{1}{4}}$	$\underline{19\frac{1}{4}}$	$\underline{3\frac{1}{4}}$

4. If $\frac{2}{3}$ of the 180 students enrolled in a school were not interested in the needle trades, how many students made up the needle trades class?

5. In most vocational schools, 3 hours of the 6-hour school day is spent in shop. What fractional part of the school day is this?

6. If there are 20 school days in one month and a student is absent 5 days, what fractional part of the school month was she in shop?

7. Multiplication of fractions:

   a. $15 \times 1\frac{1}{3}$

   b. $72 \times \frac{1}{4}$

   c. $4\frac{1}{2} \times 50$

   d. $30\frac{1}{2} \times 57\frac{1}{2}$

   e. $40\frac{1}{2} \times 65$

   f. $87\frac{3}{4} \times 65$

8. Select the correct answer to the following problems:

a. $\frac{2}{3}$ of 12 equals (18) (9) (6) (8)

b. $\frac{8}{16}$ of 144 equals (24) (36) (72) (90)

c. $\frac{2}{8}$ of 36 equals (6) (9) (12) (8)

d. $\frac{5}{12}$ of 288 equals (24) (102) (60) (120)

e. $\frac{3}{12}$ of 144 equals (36) (48) (72) (90)

9. **Division of fractions:**

a. $11\frac{2}{3} \div \frac{5}{6}$

b. $196 \div \frac{3}{8}$

c. $\frac{9}{36} \div \frac{5}{8}$

d. $1769 \div 30\frac{1}{2}$

e. $14\frac{2}{3} \div \frac{4}{9}$

f. $\frac{3}{4} \div \frac{3}{8}$

g. $1134 \div 17\frac{1}{2}$

h. $372 \div 8\frac{1}{4}$

10. **Subtraction of fractions**

a. $\begin{array}{r} 367\frac{3}{8} \\ -\ 89\frac{1}{4} \\ \hline \end{array}$

b. $\begin{array}{r} 309\frac{3}{4} \\ -\ 93\frac{3}{8} \\ \hline \end{array}$

c. $\begin{array}{r} 114\frac{1}{4} \\ -\ 56\frac{3}{4} \\ \hline \end{array}$

d. $\begin{array}{r} 612\frac{1}{4} \\ -\ 364\frac{3}{4} \\ \hline \end{array}$

UNIT III - MEASUREMENT

ACHIEVEMENT TEST No. 3

---

1. Complete the following:

   a. ______ buttons in $\frac{3}{4}$ of a gross

   b. ______ pairs in 6 units

   c. ______ minutes in $\frac{1}{4}$ hour

   d. ______ yards in 180 inches

   e. ______ dozens in $1\frac{3}{4}$ gross

   f. ______ inches in 3 feet

   g. ______ minutes in $3\frac{1}{2}$ hours

   h. ______ ounces in $\frac{5}{8}$ of a pound

   i. ______ yards in 54 inches

   j. ______ inches in $\frac{5}{8}$ of a yard

2. State whether the following answers are true or false:

   a. ______ 1 yard = 35 inches

   b. ______ $\frac{2}{3}$ of a yard is 24 inches

   c. ______ 11 gross equals 1 great gross

   d. ______ 6 hours equals $\frac{1}{3}$ of a day

   e. ______ 4 inches are used in four 1-inch tucks

   f. ______ $\frac{5}{8}''$ is more than $\frac{1}{2}''$

   g. ______ 9 gills equals 2 pints

   h. ______ $\frac{1}{8}$ of a yard equals 6 inches

   i. ______ $\frac{6}{4}$ are found in $1\frac{1}{2}''$

   j. ______ $\frac{1}{4}''$ of material is allowed for a $\frac{1}{8}''$ tuck

3. If one yard of cotton costs 48¢, find the cost of $\frac{5}{8}$ of a yard.

4. If one gross of buttons costs $4.50, find the cost of 6 buttons.

5. What is the cost of 10 jeweled buttons at $3.00 a dozen?

6. Make out a bill using the following items:

$2\frac{1}{2}$ yards of dacron/cotton	@	69¢ per yd.
$14\frac{1}{4}$ yards of canvas	@	89¢ per yd.
$2\frac{1}{2}$ lbs. pins	@	$1.10 per lb.
$4\frac{5}{8}$ yards of voile	@	62¢ per yd.
$7\frac{7}{8}$ yards of Bengaline	@	85¢ per yd.
$20\frac{3}{4}$ yards of gingham	@	44¢ per yd.
4 spools of thread	@	$4.80 a dozen spools
$2\frac{1}{4}$ dozen buttons	@	$4.50 a gross

7. Change each measurement to the unit indicated:

a. 15 feet = ______ yards

b. 8 feet = ______ inches

c. 176 inches = ______ feet

d. $6\frac{1}{2}$ yards = ______ inches

e. 9 ft. 8 in. = ______ inches

8. Perform the arithmetical process required in each case:

a. $\begin{array}{r} \text{3 yds. 9''} \\ -\ \underline{\text{1 yd. 11''}} \end{array}$ b. $\begin{array}{r} \text{6 yds. 9''} \\ \times\ \underline{\text{28}} \end{array}$ c. 9' 10'' ÷ 8

9. What part of a yard, in lowest terms, is the same as:

a. $\frac{18}{36}$ b. $\frac{27}{36}$ c. $\frac{24}{36}$ d. $\frac{30}{36}$ e. $\frac{9}{36}$

10. How many yards of fabric does a seamstress need if she must have:

a. $\frac{17}{4}$ yds. b. $\frac{27}{8}$ yds. c. $\frac{33}{6}$ yds. d. $\frac{45}{3}$ yds. e. $\frac{18}{2}$

11. If $\frac{7}{8}$ of a yard of imported 2" velvet costs 77¢, how many yards can be purchased for $10.12?

12. Change the following:

a. $\frac{3''}{4} = \frac{\quad ''}{8} = \frac{\quad ''}{16}$

b. $\frac{1}{4}$ yd. $= \frac{\quad}{8}$ yd. $= \frac{\quad}{16}$ yd.

c. $\frac{1}{2}$ dozen $= \frac{1}{\quad}$ gr.

d. $\frac{3''}{8} = \frac{\quad ''}{16} \quad \frac{\quad ''}{32} \quad \frac{\quad ''}{64}$

13. List the units of money received in change from $5.00 for $2.43 worth of merchandise.

14. The following is a list of cash received:

123 pennies
260 nickels
77 dimes
22 quarters
16 halves
145 dollar bills
25 five-dollar bills
12 ten-dollar bills
15 twenty-dollar bills

What was the total cash received for the day?

UNIT IV - RATIO AND PROPORTION

ACHIEVEMENT TEST NO. 4

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1. A pleated skirt measures 36" around the hip, the pleats are 1" wide and 1" deep. How much extra fabric will have to be taken in for a 27" waistline? How much for each pleat?

2. Mary's hip measurement is 34". How much linen (36" wide) is needed for an all-around pleated skirt (the width between pleats is 1" and the underlay is 2", the finished length is 25" including hem?)

3. Jane plans to use a commercial blouse pattern, but discovers that the sleeve pattern is too long. If she shortens it 1½", what size tuck does she take across the pattern?

4. Mary worked on a dress for 27 hours; Jane worked 3 hours. What is the ratio of Mary's time to Jane's?

5. If a length of percale is 48" long and 36" wide, find the ratio of the length to the width.

6. Of the $4.20 paid for making a dress, $1.05 was paid to the operator. What is the ratio of the operator's cost to that of other costs?

7. A morning class made 55 blouses, and the afternoon class made 75 blouses. What is the ratio of the work done by the former class to that of the latter?

8. The trimmings for 18 dresses cost $9.36. $11.96 will purchase trimming for how many dresses?

9. If 6 yards of seam binding costs 10¢, what is the price of 45 yards?

10. If 16 girls can complete an order of baby bibs in 30 hours, how long will it take 12 girls to complete the same work?

11. Twenty-six dickeys can be cut from 1½ yards of piqué. How many dickeys can be cut from 2¼ yards of the same width piqué?

12. How much will 12 yards of muslin cost if 48 yards cost $12.12?

13. A graduate of our school earned \$135 in three weeks. How long will it take her to earn \$1080?

14. How many yards of 40" organdy did it take to make 8 yards of finished ruffling? The allowance for shirring is twice the finished length. The ruffle has a quarter-inch hem, two $\frac{1}{8}$" tucks, and is 5" wide when finished.

15. A piece of organdy one yard square is sent out to be cross-tucked. If the fabric is pin-tucked at intervals of one inch, how large will it be when it is completed? (Pin tucks use $\frac{1}{8}$" of material.)

16. A length of 40" wide rayon crepe was sent out to be tucked. The tucking machine was set for $\frac{1}{16}$" tucks with $\frac{1}{4}$" spaces. How wide was the fabric when it was returned?

17. What is the ratio of shirring in the following garments:

	Length of fabric used	Finished piece
a.	$31\frac{1}{2}$"	18"
b.	4 yards	24"
c.	20"	6"
d.	90"	36"
e.	20 yards	$3\frac{1}{3}$ yards

18. How many yards of wool (54" wide) will be needed for a skirt with full depth pleats measuring 36" at the hip line and 27" long including hem?

UNIT V - DECIMALS

ACHIEVEMENT TEST No. 5

---

1. In each part write only the result:

a. 10 x 7.75
b. 100 x .934
c. 1000 x 59.3
d. 35 ÷ 10
e. 147.50 ÷ 10
f. 3.7 ÷ 100

2. In each part write the value correct to the nearest cent:

a. $12.193
b. $2.876
c. $75.285
d. $90.075

3. Write each of the following numbers as decimals:

a. 5 & $\frac{5}{10}$
b. 10 & $\frac{7}{100}$
c. 35 & $\frac{295}{1000}$
d. 67 & $\frac{3}{4}$

4. Subtraction of decimals:

a. $4.24 - $\frac{3}{10}$ dollar
b. $6.48 - $\frac{3}{4}$ dollar
c. $8.35 - $\frac{9}{10}$ dollar
d. 25.666 - 15.289
e. 43206.9 - 2865.7

5. Multiplication of decimals:

a. 6.13 x 6
b. 38.2 x 197.6
c. 29.11 x 9
d. 158.75 x 62.5
e. 9.16 x .702
f. 352 x 4.372

6. Division of decimals:

a. 14.23 ÷ 8

b. 7.0925 ÷ .025

c. 374.072 ÷ 8.56

d. 4.914 ÷ .63

e. 25.25 ÷ .0625

f. 604.0125 ÷ 309.75

7. Addition of decimals:

a. 4.6, 35.8, 141.90, 8.17, 9145, 3.96, 38

b. .57, .32, 1.35, .19, .48

c. .379, 2.005, .876, .91, .8

d. 24.056, 18.287, .94, 7.876, .093

e. .983, 15.26, 9.0, 8.264, .007, 36, 25.08

UNIT VI - PERCENTAGE

ACHIEVEMENT TEST NO. 6

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1. Write the following as decimals:

   a. 90%
   b. 5%
   c. $72\frac{1}{2}\%$
   d. $67\frac{1}{4}\%$
   e. $33\frac{3}{4}\%$

2. Solve the following:

   a. 10% of 10 dozen buttons ______________

   b. $66\frac{2}{3}\%$ of 30 yards of percale ______________

   c. $12\frac{1}{2}\%$ of 32 zippers ______________

   d. $37\frac{1}{2}\%$ of 24 dresses ______________

   e. 12% of $12.75 ______________

   f. 6% of $12.50 ______________

   g. 20% of one hour ______________

3. Figure the net cost of the following bills:

   a. 6 dresses @ $10.75
   2 dresses @ $12.75
   Discount 8%

   b. 600 zippers @ $0.11344
   55 pr. of pads @ 25¢ a pair
   2 gross butts. @ $4.25 a gr.
   Discount 1%

   c. 450 yards of material @ $0.657
   212 yards of material @ $.565
   Discount 2%

4. Find the commissions earned by each of the following salesmen:

	Amount of Sales	Commission
a.	$26,450.50	7% for earnings above $10,000
b.	$15,575.25	6%
c.	$25,430.25	5%
d.	$31,325.50	5% on the first $8000 and 2% on the balance
e.	$150,675.75	$4\frac{1}{2}$%

5. Find the interest on the following:

a. $625 @ 6% for 6 mos.
b. $3200 @ 6% for 2 yrs. 2 mos. and 2 days
c. $450 @ $4\frac{1}{2}$% for 1 yr.
d. $230 @ 6% for 3 mos.

6. Doris earned $1.25 an hour; her employer declared a 30% increase. How much is Doris earning now?

7. The labor costs of operating the shipping department amounted to $425 a week, which represents 12% of the amount billed to the customers. What was the amount of money received from customers?

8. What is the market price of one child's romper if the original cost is $9.00 a dozen and the markup is $33\frac{1}{3}$%?

9. Find the per cent of profit on an article bought for $12 and sold for $16 if the overhead expenses are 30% of the cost. Express answer to the nearest tenth of a per cent.

10. Marie bought a dress that was marked $25 at a reduction of 15%. What did she pay for the dress?

11. Janet bought a coat at the sale price of $66. The shopowner told her that the original price had been reduced by $33\frac{1}{2}$%. What was the original price?

UNIT VII - GEOMETRIC FORMS

ACHIEVEMENT TEST No. 7

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1. A circular ruffle is made of seven 8" circles and is trimmed with 2 rows of narrow rickrack braid, on the edge and one inch from the edge. How much braid is needed?

2. How many square yards are there in a piece of nylon net measuring 72 inches wide and $6\frac{3}{4}$ yards long?

3. How many pin cushions can be made out of $\frac{1}{4}$ yard of felt 72" wide, if it takes a 4-inch square to make each side of the pin cushion?

4. How many chiffon scarfs 40 inches long and 20 inches wide can be cut from a piece of nylon chiffon 42" wide, if the length of the bolt is (a) 43 yards? (b) 31 yards? (c) 18 yards?

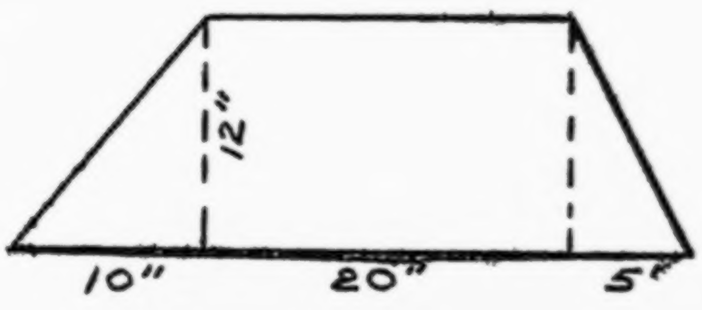
5. The following ad appeared in the Women's Wear Daily, "Contractor wanted, located within a radius of 75 miles from New York City." What is the total number of square miles covered in this area?

6. How much 39-inch cotton faille would be needed for a 12-inch square pillow with a 2-inch box edge? (Include a $\frac{1}{2}$ inch seam allowance on all edges.) Do not forget to include the length of the strip needed for the box edge.

7. A white piqué strip of material was placed vertically on the front of a dress for trimming. The length was 45 inches and the width was $2\frac{1}{2}$ inches, including seam allowances. How much 36" piqué is needed for 56 dresses?

8. If the circumference of a circular skirt is $4\frac{2}{3}$ yards, what is the diameter of the material needed to make it?

9. After cutting a pattern, Brenda finds that she has a substantial piece of material left over, as shown. How many square inches does she have?



UNIT VIII - ACCOUNTS

ACHIEVEMENT TEST NO. 8

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1. **Fill in the missing figures in the following:**

	Cash Receipts	Cash Payments	Balance
a.	$11,719.32	?	$8,690.18
b.	8,123.25	$2,330.15	?
c.	?	5,657.68	15,748.25
d.	20,890.19	7,819.34	?

2. **Fill the missing figures in the following:**

	Inventory B.O.M.	Purchases	Inventory E.O.M.	Cost of Goods
a.	$4,159.76	$3,929.48	$3,150.00	?
b.	?	7,105.00	4,235.15	$8,504.85
c.	3,284.29	?	5,463.19	2,606.10
d.	2,191.50	8,439.62	?	5,132.62

3. **Reconcile the bank balance in each of the following:**

   a. **The check book balance was $376.52 and the bank statement showed a balance of $523.83. Checks for $69.20, $56.00, and $22.11 were still outstanding.**

   b. **The bank statement listed the balance as $375.61, but the check book showed only $187.65. The service charge was $1.12. The three outstanding checks were for $29.75, $41.98, and $31.25. A deposit of $86.10 had not been recorded in the check book.**

   c. **Ethel Martin's April bank statement for her dress shop showed a balance of $3,721.59 while her check book balance was $3,916.02. Three outstanding checks were for $103.48, $12.50, and $76.59. A deposit of $387.00 was not included in her statement.**

4. The finishers sew buttons on style#617 at the rate of 18¢ per dozen. How many dresses, 10 buttons to the dress, must a finisher average daily to earn $45.00 weekly?

5. How many expert pressers, averaging 40 dresses a day, are needed for a factory having a weekly output of 1,000 dresses in a five-day week? What does each worker earn weekly when he is paid 39¢ a dress?

6. In the garment trade the busy seasons cover a period of 44 weeks. How much does a cutter earn who averages $125.00 a week during the busy season? What is his average weekly wage for the year? (Assume an 8-week lay-off.)

7. An operator earned $75.00 weekly and her sister, $66\frac{2}{3}$% as much. They gave 60% of their earnings toward the family support. How much had each left for her own use?